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Agricultural Production 26

Student Workbook

Grade 11

INTERIM 1991

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TABLE OF CONTENTS

PAGE

INTRODUCTION 1
    Working in the Community 3

AGRICULTURE: THEN AND NOW 5
    Reasons for Change 6
    Technology Change and Jobs 7
    Trends in Production 8

THE FOOD INDUSTRY 9

THE FOOD CHAIN 15

PRODUCERS AND CONSUMERS 18
    Supply and Demand 18
    Supply and Demand in Jobs 20
    Consumer Trends 23
    Why People Buy 24
    Advertising 26
    Packaging 27
    Consumer Protection 29

FACTORS OF PRODUCTION 32
    Agriculture in the News 32
    Regional Factors of Production 38

FARM SAFETY 40
    Machinery Safety 41
    Animal Safety 42
    Personal Safety 43

LAND 48
    The Composition of Soil 50

LAND CARE EQUIPMENT 65

SOIL EROSION 71
    Wind-Erosion Conservation Techniques 73

PLANT PRODUCTION 79
    How Plants Live 80
    Plant Parts 93

PLANT PRODUCTION IN ALBERTA 96
    Plants and Jobs 97
    The Grain Elevator 99

TABLE OF CONTENTS (continued)

PAGE

CROP ROTATION 104

CROP MANAGEMENT 107

CROP PROTECTION 109
  Crop Insurance 112

DEMONSTRATION PLOTS 118

LIVESTOCK PRODUCTION 128
  Needs of Animals, Fowl, and Insects 129
  Animal Groups 129
  Livestock Producers 137
  Jobs in the Livestock Industry 153
  Animal Health 172

FARM MANAGEMENT 180
  Supply Management 180
  Farm Storage Practices 182
  Work Standards 183

GLOSSARY 186

APPENDICES

1. Agricultural Production 26 Profile 188
2. Work Standards and Management Monthly Evaluation Chart 191
3. Record of Field Experience 192
4. Community Partnership Evaluation Form (Community Partner) 193
5. Community Partnership Evaluation Form (Student) 194
6. Job Sheet Evaluation Record 195

JOB SHEETS

PAGE

1. The Food Industry 11
2. Working in the Food Industry 13
3. Supply and Demand 22
4. Packaging in the Food Industry 28
5. Soil Samples 52
6. Soil Water Holding Capacity 53
7. Organic Matter in Soil 58
8. Soil Types 63
9. Operating Land Care Equipment 67
10. Observing Water Erosion on Soil, Due to Methods of Cultivation 74
11. Observing Soil Erosion Due to Water 76
12. Plant Transpiration 84
13. Parts of a Legume 89
14. Root Types 91
15. Crop Seeds 94
16. The Grain Elevator 102
17. Crop Rotation 105
18. Planning an Indoor Crop 114
19. Growing an Indoor Crop 116
20. Planning a Demonstration Plot 119
21. Growing a Demonstration Plot 121
22. Identifying Fertilizers 123
23. Crop Pests and Diseases 125

JOB SHEETS (continued)

PAGE

24. Livestock Production 134
25. Livestock 141
26. Indicators of Finish 144
27. Ideal Characteristics of a Cow 147
28. Ideal Characteristics of a Bull 149
29. Handling and Showing Livestock 151
30. Investigating Livestock Production Jobs in the Community 155
31. Beef Production 159
32. Identifying Cuts of Beef 163
33. Swine Production 166
34. Identifying Cuts of Pork 170
35. Maintaining Animal Health 173

Read and complete the 'Student Safety Pledge Form' below.

STUDENT SAFETY PLEDGE FORM

______________________________________, who is enrolled in Agricultural Production 26, will, as a part of the learning experience, operate equipment and tools, providing written parental/guardian permission is given.* Each student will be given proper instruction, both in the use of the equipment and tools and in correct safety procedures, before being allowed to work alone. Because the student must assume responsibility for following safety practices, we ask that he or she subscribe to the following safety pledge.

- I WILL FOLLOW ALL SAFETY RULES.
- I WILL NOT ASK PERMISSION TO USE AN ITEM OF EQUIPMENT OR TOOL UNLESS I HAVE BEEN INSTRUCTED IN ITS USE.
- I WILL REPORT ANY ACCIDENT OR INJURY IMMEDIATELY TO THE TEACHER/SUPERVISOR.

DATE __________ STUDENT'S SIGNATURE ______________________________________

I hereby give my consent to allow my son or daughter to operate all equipment and tools necessary to carry out the tasks in this course.

DATE __________ PARENT'S/GUARDIAN'S SIGNATURE ______________________________

Parents/Guardians are cordially invited to visit and arrange to view any tasks performed by the students.

* Parental/Guardian's consent is necessary only if the student is a minor.

INTRODUCTION

Agricultural production is the process of raising plants and animals and preparing them for sale. It starts with the farmer, who raises agricultural products.

Also, many businesses and industries are part of agricultural production, in two ways:

1. Some provide goods and services to the farmer.

2. Some prepare the plants and animals grown on the farm for resale to consumers.

This course will provide many opportunities for you to learn about agriculture in Alberta. You will learn about plant and animal production on the farm and you will explore many of the occupations that are available in the agricultural industry. Appendix 1: Agricultural Production 26 Profile outlines the major activities you will perform during this course.

SAFETY IS EVERYONE'S BUSINESS

The proper and safe use of equipment, tools and supplies protects you, others and property in both the school lab and in the workplace.

Job sheets in this workbook contain safety information (e.g., safety rules, practices, cautions, protective clothing/gear) where appropriate.

SAFETY PRACTICES AND PROCEDURES
MUST BE FOLLOWED

NOTE: Safety practices may vary in different situations. **Always follow your teacher's/supervisor's instructions.**

STUDENT ACTIVITIES

Alberta farmers produce many different products. Some products are grown in all areas of the province; other products are grown only in certain regions of the province.

1. List six agricultural products grown in Alberta. Place a star beside those grown in your community.

   ____

   ____

   ____

   ____

   ____

   ____

2. Complete a chart of businesses in your community that play a role in agricultural production. Include businesses that:

   a. supply services and supplies to farmers
   b. assist in the processing of farm products for sale to consumers
   c. sell agricultural products.

Service and Supply	Processing	Sales

3. a. Brainstorm to identify the occupations that may be available in each of the businesses you listed in the chart.

   b. List each occupation.

c. Select three of these occupations and indicate why they are of most interest to you.

____

____

____

____

WORKING IN THE COMMUNITY

During this course, you will be learning about agricultural production by working with people in your community. This is an opportunity for you to learn about:

- occupations in agricultural production
- the jobs or tasks of different occupations
- what is involved in being an employee
- the businesses that employ people with skills in agricultural production.

Before you start a community partnership learning experience, you should be familiar with the following information about the place you will be working:

- What supplies or services does this business offer?
- What are the hours of operation?
- What is the appropriate clothing to wear?
- What will be expected of the student-employee while working at this business?
- What is the name of the person to whom you will be reporting?

STUDENT ACTIVITIES

1. Can you add to this list? What else should you know before going to work? ________________

____

____

2. a. During your community partnership experiences, keep a record of the types of jobs that you do. This will help in preparing a personal résumé. Use a copy of Appendix 2 (Part A) to record work performed at each field experience location.

b. You should also record other ideas that you want to remember. This can help you decide about a career in agricultural production. Some things that you may wish to record are:

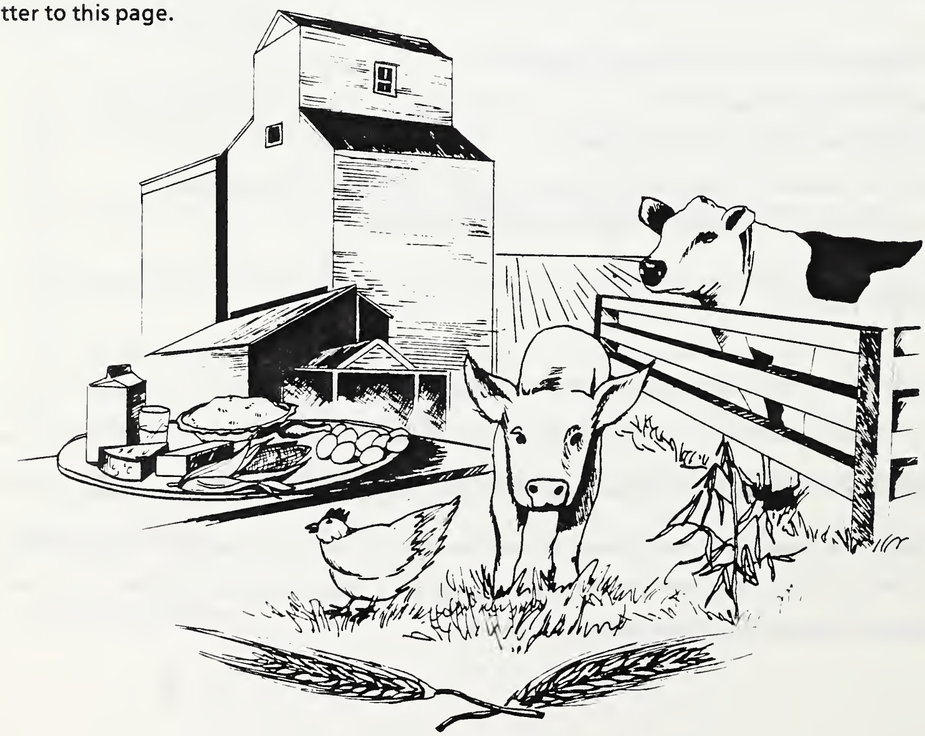
- jobs that you really enjoyed doing
- information about the training needed to do a certain job
- the names of people with whom you worked
- jobs that you were very good at doing
- jobs that you need to learn more about.

Use Appendix 2 (Part B), to record this information.

3. After each extended field experience (one or more days), you should write a thank you letter. Address this to the person to whom you reported. You will want to thank them for the opportunity to learn in their business and you may wish to include what you learned and what you enjoyed while working for them.

STUDENT ACTIVITIES

1. Compose a sample thank you letter to J. Smith, XYZ Farm, Anywhere, Alberta. Attach the sample letter to this page.



AGRICULTURE: THEN AND NOW

There have been many changes in agricultural production since the first Albertans started farming. These changes include:

- the invention of machines and equipment
- changes in knowledge about agriculture
- changes in methods of transporting products
- changes in the industries and businesses that support agriculture.

All of these changes mean that farming is different today from what it was many years ago.

STUDENT ACTIVITIES

1. Discuss: How have changes affected farming in Alberta? Record the major points from the discussion.

2. Select a business that is part of the agricultural production industry. In small groups, do two short skits. In the first one, show what the business would have been like 20 years ago. In the second skit, show how change has affected this business.

REASONS FOR CHANGE

Technology uses scientific knowledge to improve the ways in which work is done. Many of the changes in agriculture are due to the introduction of modern technology.

Technological improvements include inventing better ways of doing things: manufacturers find faster ways to make tools and equipment; scientists experiment with new ways to grow farm products; farmers experiment with and use the new ideas on their farms, and agriculturalists look for new technology to improve the products.

Farmers will ask several questions before deciding to use new technology in their operation. These may include:

- What will it cost?
- Will it make farming faster and easier?
- Will the change help grow more of an agricultural product?
- Will the change help make a better quality product?
- Does it meet the personal needs or wants of the farmer?

STUDENT ACTIVITIES

1. Discuss the following changes in agricultural production. Decide which of the above reasons would have been a factor in the decision to accept that change. Record the reasons for each change.

a. The use of tractors instead of horse and oxen to do field work.

____

____

b. Acceptance of milk pasteurization.

____

____

c. The increased use of fertilizers and pesticides in crop production.

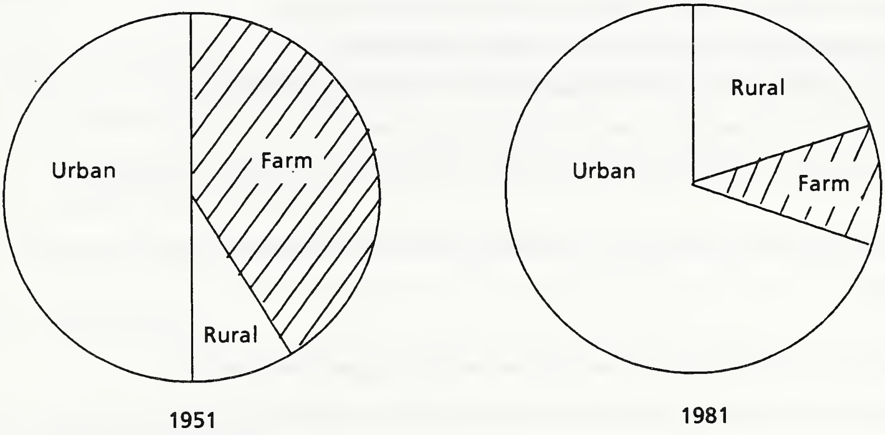
____

____

TECHNOLOGY CHANGE AND JOBS

When technology brings about changes, people's work may also change. The actual tasks or things a person does in a job may change, less people may be involved in farming, new careers may be created and some careers become obsolete. For example:

- there are very few blacksmiths today, partly because of changes in technology
- computers are starting to change the task of farm and business record keeping
- there are fewer farmers today than in 1951, partly because technology has improved farm efficiency.



Changes in Urban, Rural and Farm Populations, 1951-1981

STUDENT ACTIVITIES

1. As a class, do a wall mural or a display depicting how technological change has affected the jobs in agricultural production.

Chart adapted from *Agriculture and Me* by N. Hochachka. Copyright 1987 Alberta Agriculture. Reprinted by permission.

TRENDS IN PRODUCTION

A trend is a change that has continued over a period of time or a direction something is moving towards. When something is described as a "direction trend", it is expected to happen more often in the future. For example, ten years ago very few musicians had recorded a rock video. The **trend** today is that most music groups are recording rock videos.

STUDENT ACTIVITIES

1. The following are some trends and changes in agricultural production. Underline or highlight those that are happening in your community.

   - Farmers are becoming more aware of the safety precautions for their occupation.
   - A farmer can produce more bushels per acre than in the 1950's.
   - Pork is leaner.
   - More farms are specializing in one type of production.
   - People are eating more meals in restaurants.
   - There are more types of food available on the grocery store shelves.
   - There is increased efficiency in growth of poultry and livestock.
   - There is increased access to international markets for agricultural products.
   - Mechanization has increased in the food processing industry.
   - The identification of Alberta agriculture products on grocery store shelves is increasing.

2. a. Choose one of the above trends and brainstorm how it could affect agricultural production in the future.

   b. As a class project, predict some future positive trends in agricultural production.

____

____

____

____

____

____

____

THE FOOD INDUSTRY

Agricultural production is concerned with producing food for people and animals. When the food grown for people leaves the farm, it becomes part of the food industry. The food industry includes the many businesses that handle agricultural products after they leave the farm, including:

- commercial food businesses (e.g., restaurants and hospitals)
- food processing businesses (e.g., flour mills and milk plants)
- wholesale food outlets which sell food products to commercial and retail food outlets
- retail food outlets (e.g., grocery stores, supermarkets)
- transportation businesses that transport raw and processed products
- food scientists who experiment with improving the quality of food
- testing agencies that ensure our food supply is safe to use
- brokers and marketing agents who try to find new markets for food products (e.g., provincial and interprovincial markets, export markets)
- manufacturers who supply the packaging (e.g., labels, bags, and boxes) in which food is sold
- meat packing and processing plants.

STUDENT ACTIVITIES

1. Identify two businesses in your local and surrounding communities that have the following roles in the food industry. You may wish to use the telephone book, Yellow Pages or other local directories to help with this task.

   - Commercial food production

     ____

     ____

   - Food processing

     ____

     ____

   - Wholesale food outlet

     ____

     ____

   - Retail food outlet

     ____

   - Manufacturing

     ____

     ____

2. a. Choose a food product that you enjoy eating. Make a list of the businesses in the food industry that are involved in getting that food from the farm to you.

   b. Draw a flow chart to show the stages that the food material goes through, from growing the raw food to being eaten by consumers.

   c. For your example, list the jobs that are available at each stage of the food industry.

JOB SHEET 1
THE FOOD INDUSTRY

Investigate and compare two jobs in the food industry. Use the following chart to record the information you collect and compare the two jobs.

	Job 1	Job 2
Job Title		
Part of the Food Industry This Job Relates to		
Training/Education Needed		
Tasks Performed on the Job		

	Job 1	Job 2
Advantages of the Job		
Disadvantages of the Job		
Would You Like this Job? Why?		

JOB SHEET 2
WORKING IN THE FOOD INDUSTRY

There are many occupations available in the food industry. This job sheet will help you prepare for one of these occupations. It will also help you decide what things you need to learn to plan a career in the food industry.

1. Start by selecting a business or industry in the community that can provide you with some working experience in the food industry. Consider processors, manufacturers, and retail and commercial sales outlets. List below, in priority order, three businesses where you would be interested in working.

   a. ______________________________
   b. ______________________________
   c. ______________________________

2. Review this list with your teacher. Discuss the types of jobs that you may be doing in each business. Select the one business that most interests you. Write the name, address, and phone number of that business below. Why does this business interest you?

   Name: ______________________________
   Address: ______________________________
   Telephone: ______________________________
   Reason for interest: ______________________________
   ____
   ____
   ____
   ____

3. Meet with the employer of this business to discuss the tasks of the job. After your interview, list these tasks below. Place an X beside those tasks that you have not done before.

   ____
   ____
   ____
   ____
   ____

4. After you have worked in this business, evaluate what you learned by using a copy of the Community Partnership Evaluation Form, Appendix 3.

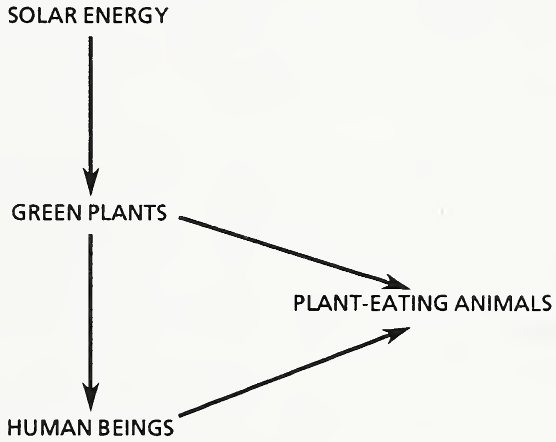
5. Prepare and present a report to the class about working at this business. Include the following:

   - To what part of the food industry does this business belong?
   - What jobs did you do in this business?
   - What tasks were involved in these jobs?
   - What other job opportunities were available in this business?

THE FOOD CHAIN

A food chain shows how a living organism obtains its food and how solar energy is used to produce energy for animals and humans.

This is a diagram of a simple food chain.



In this food chain:

- green plants use solar energy to grow
- when an animal or human eats a plant, they are indirectly using the solar energy as energy for themselves
- people benefit from solar energy when they eat meat products.

Each living creature (i.e., plant, insect, animal, human) has a food chain and is part of a larger food chain that includes all living things.

STUDENT ACTIVITIES

1. Draw a chart to show a simple food chain for each of the following:

   a. Turkey

   b. Sheep

   c. A person who is a vegetarian

2. Draw a food chain to show your eating habits.

3. a. What three food products are not commonly available in the winter? Why not?

   b. What do food producers, processors, and brokers do to ensure that consumers have vegetables, meat, fruit and other food products available throughout the year?

PRODUCERS AND CONSUMERS

There are two major groups of people in the food chain, producers and consumers.

- A producer is a person who makes, grows or provides something.
- A consumer is a person who uses a product or service.

STUDENT ACTIVITIES

1. Using your local community as a resource

   a. List three examples of producers.

   b. List three examples of consumers.

   c. List three examples of when you act as consumer.

2. Can a person be both a producer and a consumer? How?

SUPPLY AND DEMAND

Supply and demand are important words to agricultural production employers and employees. These terms are used to describe the **market** for agricultural products.

- **Supply** is the amount of a product or service that is available for sale (e.g., there is a good supply of barley this year).
- **Demand** is the amount of a product that consumers want to buy. It may also describe the quantity of a service that consumers want to purchase (e.g., in the summer, there is a high demand for steaks to barbecue.)

Supply and demand help to decide the price of a product. If supply is high, the price of a product may be low. If supply is low, the price of a product may be high (e.g., in the summer when there are a lot of fresh vegetables in the store, the price is usually lower than in the winter when product availability is scarce).

When the demand for a product or service is high and the supply is low, the price is usually higher. When the demand for a product or service is low, the price is usually lower. For example, when a new record is released, many people want to buy that record. The demand is high for the new record, so the price is high. After the record has been in the stores for a year, not as many people want to buy the record and the record usually goes on sale. The demand for the record is less and the price becomes lower.

The effect of supply and demand on prices can be summarized as follows:

- The price may go up when:
    - supply is low
    - demand is high.
- The price may go down when:
    - supply is high
    - demand is low.

STUDENT ACTIVITIES

Read each of the following statements. Decide how supply or demand will be affected in each situation and indicate why either or both supply and demand will be raised or lowered. Write your answers in the spaces provided.

1. Several people watched a television show on using honey, and now they want to try the recipes.

2. Due to drought, the average barley yield is expected to be less than 20 bushels per acre. The average yield is normally 70 bushels per acre.

3. In the summer, people like to barbecue, especially steaks and hamburgers.

4. Several farmers quit raising hogs because the selling price was too low compared with the cost of production.

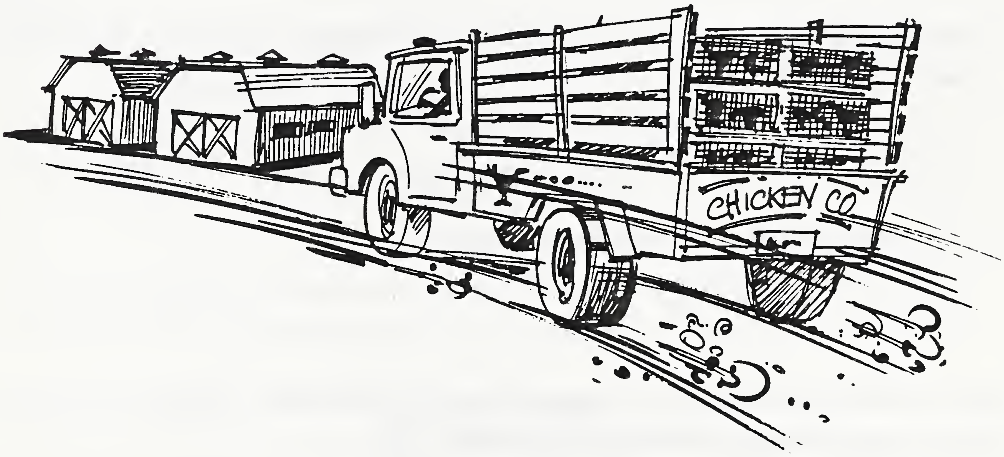
5. People in the United States have discovered that Canadian bacon is very tasty.

SUPPLY AND DEMAND IN JOBS

Supply and demand affect the jobs available in the agriculture industry. Some areas of the industry may have a high demand for workers, while the number of available workers may be low. In other areas, there may be a large number of workers but few available jobs.

When a product is in demand, more workers may be needed to get that product to the consumer. There would be a need for more workers in the industries that support agricultural production. The same may be true when there is a large supply of a product. For example, if there is a large supply of chickens ready for market, there may be a high demand for workers to:

- transport the chickens from the farm to the processor
- work in processing, grading, and packaging the chickens to prepare them for sale at the retail stores
- transport the prepared chickens from processor to retailer
- work in retail stores to display and sell the chickens.



JOB SHEET 3
SUPPLY AND DEMAND

Interview an employer in an agriculture related industry. Use the following questions as a guide to learn more about the supply and demand of jobs in the industry.

1. What type of agricultural industry does this person operate?

2. What types of jobs are presently available in this business?

3. Is there a varying demand for employees in this business?

4. a. What factors influence the need for the number of employees? (Examples: season of the year, supply of a product.)

   b. Why do these factors influence employee demand?

5. How does this business handle an increased demand for employees? (Examples: hires extra people, has part-time staff, employees work overtime.)

6. What do entry-level employees earn? (Indicate approximate hourly, monthly, and annual wages.)

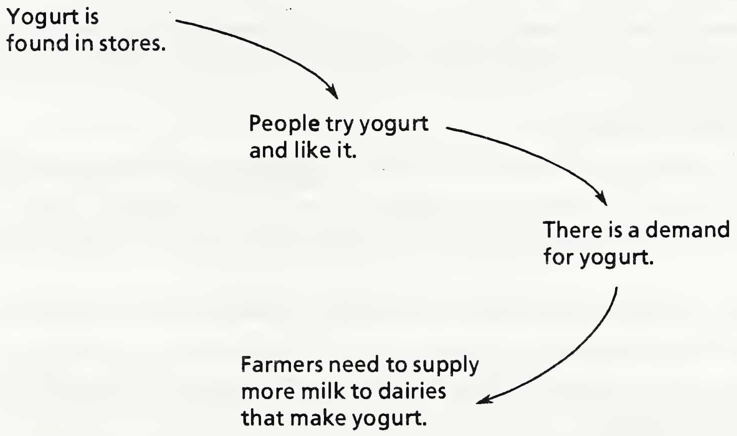
CONSUMER TRENDS

A consumer trend describes a change in what most people are buying. Some examples of past and present consumer trends include:

- more people are eating meals away from their homes
- people have increased their consumption of fresh vegetables
- more people are eating lamb
- acid-washed blue jeans are very popular.

People who work in agricultural industries depend on consumers to buy their products. **The buying practices of a large number of consumers becomes a trend. Trends in consumer buying create demand for a product. Through demand, trends help decide what is produced, how it is processed and how and where it is sold.**

The following flow chart is an example of how consumer buying practices affect what is produced in agriculture.


Yogurt is found in stores.
People try yogurt and like it.
There is a demand for yogurt.
Farmers need to supply more milk to dairies that make yogurt.

WHY PEOPLE BUY

There are many different reasons why people buy certain products. Think of the last thing that you bought. It could have been a record, a piece of clothing, or some food. List below why you think you bought this item.

I bought ____________________ because ____

____

____

____

Your reasons for buying the above product may include any or all of the following:

- **Need.** As people, we have basic needs of food, shelter, and clothing. Therefore, we buy items that meet our basic needs.
- **Want.** Often we make a purchase because it is something we want. For example, you may need a new jacket to stay warm. Even though you could get a warm jacket for $30.00, you choose the $50.00 acid-washed jacket because you want that item. Wanting something is an important part of why consumers choose to buy certain items.
- **Habit.** Sometimes people choose to buy things from force of habit. "I always buy this colour" suggests a person is buying from habit.
- **Brand Preference.** Sometimes people buy a certain brand because they have liked it or used it in the past. For example, some people only buy one make of machinery or one brand of toothpaste. This is brand preference.
- **Cost.** Cost involves two factors:
  - The amount of money a consumer has to spend. A product may be chosen because the price is within the limit that a consumer has available to spend. For example, if there is insufficient money to buy an acid-washed jacket, the customer may choose a cheaper, regular denim jacket.
  - The quality of the item. Sometimes a person may choose to spend more money on an item because it is a better quality.
- **Quality.** Quality refers to both the initial raw product and the process. For example, the quality of a sweater depends upon:
  - the quality of the wool used in construction
  - the quality of knitting, sewing, etc., used.

  Sometimes consumers will choose one product over another because of quality.

  The description of quality depends on the type and product being bought. A description of the quality for food is different from that of clothing.

Warranties and guarantees are part of quality. The manufacturer and seller usually set certain standards of quality. If a product or service fails to meet the quality claimed in the warranty or guarantee, another product may be offered as replacement, or the purchase price may be refunded.

STUDENT ACTIVITIES

1. Discuss how needs, wants, habits, brand preferences, cost, and quality could be part of the following buying decisions. Record the major points from each discussion:

   a. Buying a new car instead of a second-hand car.

   ____
   ____
   ____

   b. Buying 2% milk instead of whole milk.

   ____
   ____
   ____

   c. Buying at store A rather than store B.

   ____
   ____
   ____

   d. Buying a disk rather than a cassette tape.

   ____
   ____
   ____

   e. Eating at a gourmet restaurant rather than a pizza restaurant.

   ____
   ____
   ____

   f. Deciding to watch a video at home rather than going to the movies.

   ____
   ____
   ____

2. Refer back to the flow chart relating to yogurt, shown on page 23. Extend the arrow and explain how farmers supplying more milk for yogurt production may affect employment opportunities for agricultural workers.

ADVERTISING

Advertising has two purposes:

- it provides information to consumers about the available products
- it is used to promote the use of a product.

STUDENT ACTIVITIES

1. Define the following terms:

   a. Information ____________________

   ____

   b. Promotion ____________________

   ____

2. a. What types of information does advertising provide to consumers?

   ____

   ____

   ____

   b. List three examples of advertising that provide information.

   ____

   ____

   ____

3. a. How does advertising promote the use of a product or service?

   ____

   ____

   ____

b. List three examples of advertising that promote a product or service.

____

____

____

4. How do you think advertising affects consumer buying trends?

____

____

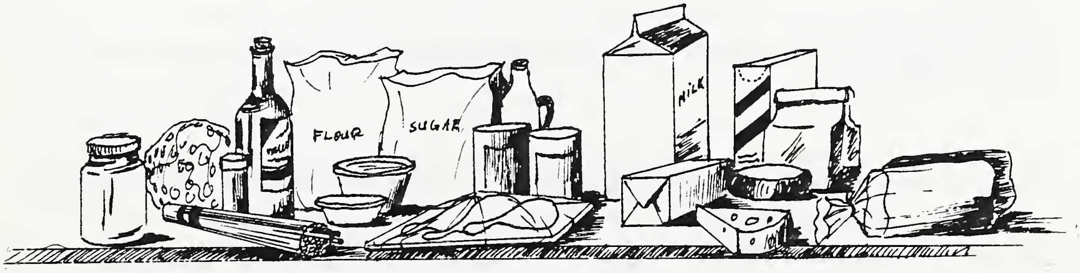
____

PACKAGING

The packaging of products has three purposes. To:

- protect the product from germs, dirt, and any other foreign particles
- inform the consumer about the contents and use of the product
- serve as a form of advertising
- encourage consumers to buy the product.

The type of packaging used depends on the type of product and the consumer demand. There can be trends in packaging. For example, several years ago milk was sold in glass bottles. It then became the trend to package milk in cardboard containers.



JOB SHEET 4
PACKAGING IN THE FOOD INDUSTRY

1. Visit a grocery store to investigate the current trends in packaging. Consider the following trends:

   - types of packages (e.g., boxes, cartons, jars, bottles)
   - information on packages (e.g., ingredients, cooking instructions, size, weight)
   - design of the packages (e.g., shape, size, use of colour)
   - trends in the sizes of packages available (e.g., metric/imperial units of weight, mass, volume).

2. Now, focus your investigation on only three products. For example, you may choose fresh produce, frozen juices, partially prepared foods, bread products, canned vegetables, and so on.

   List the trends in packaging you observed in your investigation.

   Product 1
   Name of product: ______________________________
   Trends in packaging:
   ____
   ____
   ____

   Product 2
   Name of product: ______________________________
   Trends in packaging:
   ____
   ____
   ____

   Product 3
   Name of product: ______________________________
   Trends in packaging:
   ____
   ____
   ____

   (If necessary, use an additional sheet of paper to describe trends in packaging and attach it to this page.)

CONSUMER PROTECTION

There are laws enacted by the federal government that protect consumers and help to regulate the quality of food supplies. These laws offer consumers protection in that they can expect food they buy to be safe to consume.

Consumer and Corporate Affairs Canada is a government agency that initiates many consumer protection laws. The agency uses the laws to monitor the quality, packaging, labelling, and advertising of food and other products sold in Canada. For example, under the **Weights and Measures Act**, scales, gas pumps, fuel meters, and odometers may be regularly inspected for accuracy.

The **Consumer Packaging and Labelling Act** ensures that certain information appears on labels. For example, a food label must list:

- the "Best Before" date to indicate product freshness
- special storage needs of the product (e.g., refrigeration)
- any artificial flavouring used in the product
- the quantity and type of ingredients in the order of the amount present in the product
- other information relative to the product (e.g., dairy products show the percentage of milk fat (M.F.), and meat products give a grade indicating quality).

The **Food and Drugs Act** has regulations for the processing, labelling, packaging, and storage of food products. The following is a sample section from the Food and Drugs Act about grain and bakery products:

B.13.001. [S]. Flour, White Flour, Enriched Flour or Enriched White Flour

a. Shall be the food prepared by the grinding and bolting through cloth having openings not larger than those of woven wire cloth designated 149 microns (NO. 100), of cleaned milling grades of wheat.

b. Shall be free from bran coat and germ to such an extent that the percentage of ash therein, before the addition of any other material permitted by this section, calculated on a moisture-free basis, does not exceed 1.20 percent.

From Consumer Packaging and Labelling Act. Reprinted by permission.

c. Shall contain in 100 grams of flour

    i. not less than 0.44 and not more than 0.77 milligrams of thiamine
    ii. not less than 0.27 and not more than 0.48 milligrams of riboflavin
    iii. not less than 3.5 and not more than 6.4 milligrams of niacin or niacinamide, and
    iv. not less than 2.9 and not more than 4.3 milligrams of iron.

d. May contain

    i. malted wheat flour.

STUDENT ACTIVITIES

1. What is the difference between a regulation and a guideline? Write your definition of each below.

    Regulation ____
    ____

    Guideline ____
    ____

2. a. What is the role of the Weights and Measures Act in the agricultural industry?

    ____
    ____

    b. Make a list of six businesses that may be affected by this Act.

    ____
    ____
    ____
    ____
    ____

3. Referring to the section of the Food and Drugs Act cited on the previous page, discuss how this Act protects consumers.

    ____
    ____
    ____

3. Referring to the section of the Food and Drugs Act cited on the previous page, discuss how this Act protects consumers.

4. Attach a food product label to this sheet. List the information that is provided on the label.

a. Label	b. Information provided on the label

c. What is the main ingredient of the product?

d. What percentage of the product consists of the main ingredient?

FACTORS OF PRODUCTION

The factors of production help a farmer decide what to grow. These factors of production include climate, soil, economics, market, labour, transportation. What farmers grow is important to the economy of the agricultural industry and affects the jobs that are available for people in agriculture related industries.

STUDENT ACTIVITIES

Match the factors of production in the first column with their correct definition in the second column by writing the letter of the correct definition in the space provided.

________	1. Climate	a. The meeting place of the buyer and seller.
________	2. Topsoil	b. The way supplies and products are moved between the farmer and the consumer.
________	3. Economics	c. The top layer of soil that supports the growth of plants.
________	4. Market	d. The people who work in agricultural production and industries.
________	5. Labour	e. Conditions such as rain, sun, snow, temperature and wind.
________	6. Transportation	f. The management of income, supplies and expenses necessary for the production and sale of farm products.

AGRICULTURE IN THE NEWS

Stories about agriculture often appear in newspapers. The following pages contain newspaper stories about agriculture that relate to an agricultural production factor.

STUDENT ACTIVITIES

Read each newspaper article and record answers to questions a, b, c, and d in the space beside each news item.

a. What factor(s) of production are discussed in the article?

b. What effect will this have on farm production?

c. What other agricultural industries will be affected by this factor?

d. What jobs in agriculture will be affected by this factor? How will they be affected?

Farmers fear extra railcars not enough

WINNIPEG (CP) — Prairie grain companies and farmers are worried that extra railcars being rushed in to ease a severe shortage won't be able to transport grain to Thunder Bay, Ont., before ice blocks the port.

If the port freezes before the new grain-laden railcars can reach the Lakehead, Canada stands to lose exports and cash-strapped farmers may be saddled with carrying charges to store unshipped grain until spring.

a. ______________________________
____
____
____

b. ______________________________
____
____
____

c. ______________________________
____
____
____

d. ______________________________
____
____
____

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a. ______________________________

____

____

____

b. ______________________________

____

____

____

c. ______________________________

____

____

____

d. ______________________________

____

____

____

'Soil crisis urban issue'[2]

By Allyson Jeffs

(Herald Olds Bureau)

Soil degradation and erosion are "the most serious crisis facing the agricultural industry today," says Senator Herbert Sparrow.

And urban consumers can't avoid its impact by sticking their heads in the sand and proclaiming it a rural problem, he says.

"Many areas are losing two to three inches (five to eight centimetres) of top soil a year (due to wind erosion) and when they've only got five to seven inches (13 to 18 centimetres) to start with you can see there's not much hope unless things change," he said.

Drought causes layoffs[1]

BRANDON, Man. (CP) — About 500 grain handlers were laid off at Thunder Bay, Ont., joining the list of victims of the drought.

It has withered this year's crops and grain company executives say more layoffs are possible.

"We have to face reality," said Garf Stevenson, president of the Saskatchewan Wheat Pool.

"If conditions don't turn around, we might have to make substantial cuts in staff," he said from Saskatoon, where Pool delegates are discussing the drought and other issues.

But a significant rain in the next 10 days could still bring farmers a near-average crop in many drought-hit areas.

a. ______________________________

____

____

____

b. ______________________________

____

____

____

c. ______________________________

____

____

____

d. ______________________________

____

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[1] From *The Edmonton Journal*. Copyright June 30, 1988. Reprinted by permission.

[2] From *The Calgary Herald*. Copyright July 29, 1988. Reprinted by permission.

a. ______________________________

____

____

____

b. ______________________________

____

____

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c. ______________________________

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____

d. ______________________________

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____

Dust storms tear up fields across south[1]

By DAVID HOLEHOUSE

(Journal staff writer)

While some northern Alberta farmers prepared for river floods Wednesday, dust storms were scouring fields east of Calgary.

Allan Macauley, district agriculturist at Barrhead, had his office warn farmers of the possibility of flooding along the Paddle River flats in Barrhead and Lac St. Anne counties.

In the Oyen area, meanwhile, probably 100,000 acres of cropland lost the top three or four millimetres of soil in two hours of strong winds Wednesday, said district agriculturist John Ruschkowski.

In some cases the storm sheared off plants just re-seeded after the first copy was destroyed by drought.

"People are real discouraged," he said. "It's just been getting worse all the time."

Farm machinery sales drop[2]

By Henry Cybulski

(Herald staff writer)

Like crops in many fields, optimism is withering in some areas of the province that this year will mark a turnaround in the farm machinery business.

For several Alberta equipment dealers, business has plummeted because of the bone-dry spring.

"Sales are down about 40 percent," said Gerald Wittke, owner of Wittke Farm Equipment in Medicine Hat. The decline represents between $1 million and $1.5 million in reduced income.

a. ______________________________

____

____

____

b. ______________________________

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____

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c. ______________________________

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____

d. ______________________________

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____

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1. From *The Edmonton Journal*. Copyright July 7, 1988. Reprinted by permission.
2. From *The Calgary Herald*. Copyright July 14, 1988. Reprinted by permission.

Free trade compromise lifts hog, cattle hopes

By DAVID HOLEHOUSE

(Journal staff writer)

ALBERTA PORK producers were astounded and relieved when they discovered dairy and feather industries had been exempted from free trade talks.

For months, dairy, egg and poultry producers have been the chief opponents of free trade talks that could open up immense markets to hog and cattle farmers.

It wasn't until late August, when members of the Alberta Pork Producers Marketing Board held a meeting with Canadian negotiators in the talks, that it was revealed the U.S. isn't interested in a free market for dairy and poultry products.

"I was astounded," said board vice-chairman Bill Devereux of Fort Saskatchewan.

"We were prepared to pound away that Canada would be much better off if the supply management people would be hung out to dry."

As it turned out, he said, the negotiators said supply-managed industries have nothing to fear. The U.S. wants its own milk industry protected for strategic reasons and, in return, is willing to keep Canada's milk and poultry industries out of the talks.

Supply-managed industries enjoy greater stability of income because markets are protected from imports and producers are given a quota that prevents over-supply.

Free-market industries, such as cattle and hogs, are dead-set against supply management and protectionism because their ability to produce high quality products at a low price means they can tap into the lucrative Pacific Northwest region of the U.S.

Supply-managed industries — which in Alberta made sales of $376 million last year — rely on the domestic market for most of their income. And despite what the negotiators told Devereux, they remain fearful of free trade.

"All the studies that have been done forecast a disaster for us (if the egg market is opened up to free trade)," says Wally Landrethe, secretary of the Alberta Hatching Egg Marketing Board in Edmonton.

a. ____

____

____

____

b. ____

____

____

____

c. ____

____

____

____

d. ____

____

____

____

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a. ______________________________

____

b. ______________________________

____

c. ______________________________

____

d. ______________________________

____

Egg marketing board criticized[1]

Ruffled feathers flew Tuesday as Jack Kennedy, Alberta's agent general in Hong Kong, charged that the province's egg marketing board has helped block egg exports to the British colony.

Board general manager Warren Chorney said he was "highly insulted" by Kennedy's remarks.

Alberta has missed out on opportunities to sell eggs to a hungry Hong Kong market while the United States is selling millions of dollars worth of eggs, Kennedy told the Edmonton branch of the Hong Kong Canada Business Association.

"The chief bottleneck is the Alberta egg marketing board," he said, without further explaining the comment.

Reacting, Chorney said the bottleneck is not the board but transportation costs.

Americans are capturing the colony's market because the U.S. government is subsidizing freight costs to the tune of 75 percent, said Chorney, who added he was "hurt" by Kennedy's remark.

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[1] From *The Edmonton Journal*. Copyright July 29, 1988. Reprinted by permission.

REGIONAL FACTORS OF PRODUCTION

A wide variety of agricultural products are grown in Alberta. However, different regions of the province are more suited to the growing of some crops than others.

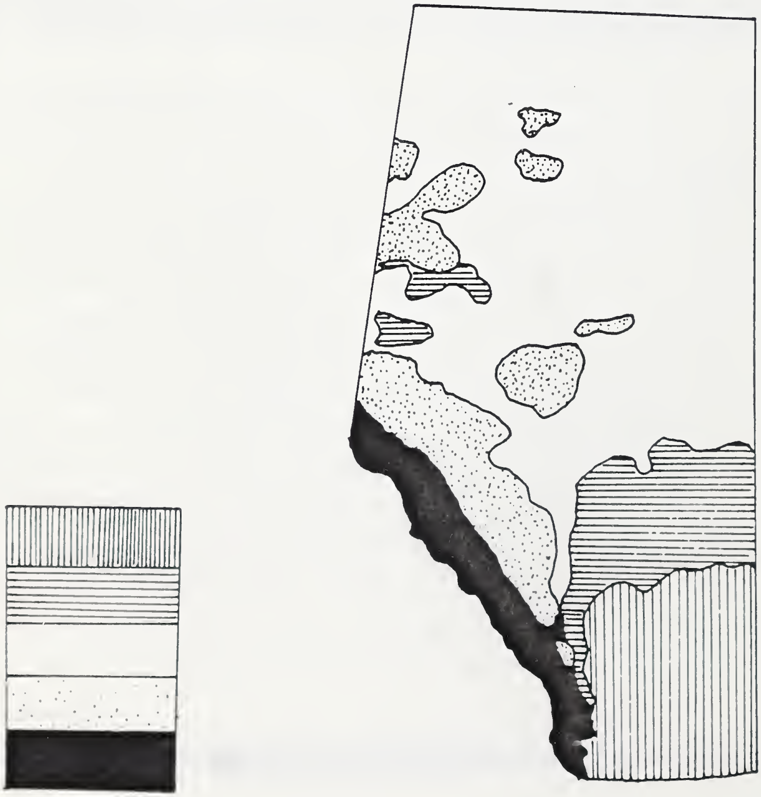
STUDENT ACTIVITIES

1. On the following map of Alberta:

   a. locate the area in which you live and mark it with a star (★)

   b. place a ✓ beside the ecoregion in which you live. What type of ecoregion is it?

      ____________ Grasslands
      ____________ Boreal Forest
      ____________ Mountains
      ____________ Parkland
      ____________ Foothills



c. Describe how the ecoregion affects the farming in our area.

____

____

____

2. Invite a district agriculturist or a local farm producer to the classroom to discuss the factors of production in your area. After the discussion, answer the following questions.

   a. What type of soil is found in the area in which you live? How does this affect farming?

   ____

   ____

   ____

   b. What is the effect of the normal climatic conditions on farming in your area (include frost free days, precipitation and temperature)?

   ____

   ____

   ____

   c. What are the market and transportation concerns of the agricultural industry in your area?

   ____

   ____

   ____

   d. How are jobs in your region affected by the factors of production?

   ____

   ____

   ____

FARM SAFETY

Farm accidents happen every year in Alberta. Some accidents are due to mistakes or carelessness; however, accidents can be avoided by following some common safety rules. Three categories of safety rules are important for this course:

- Machinery Safety
- Animal Safety
- Personal Safety.

WARNING
STAY CLEAR OF GATE
while it is being raised.
WARNING
DANGER
To avoid serious injury or death, use the tub tilt lockout valve when working around tub.
DANGER
Avoid death or serious injury from entanglement in the feed rolls.
The harvester takes crop faster than you can release it.
NEVER feed with hands or feet or use as a manually-fed stationary machine.
Disengage drives and shut off engine before manually unplugging.

MACHINERY SAFETY

The following are safety rules for people operating farm machinery.

1. When operating a piece of equipment for the first time, ask for instructions.
2. Read the equipment's safety manual before operating.
3. Do not operate any equipment for the first time unless you are under close supervision.
4. Do not wear loose clothing while operating farm machinery.
5. Before operating moving equipment on hills, be sure to receive safety instructions, particularly those about preventing rollovers.
6. Adjust the speed to suit the conditions. Be cautious of bumps, hills and slopes.
7. Concentrate on the machine operation. Avoid operating machinery if you are tired or upset.
8. Turn engine off before filling with fuel.
9. Only the driver should be riding a piece of equipment. No extra passengers are allowed.
10. Keep all safety shields and guards in place.
11. Follow traffic laws when moving farm equipment on highways and public roads.
12. Always shut a machine off and wait for all moving parts to come to a halt before doing repairs or adjustments.
13. As much as possible, do machinery repair and maintenance during long periods when equipment is not being used (e.g., the off-season).

ANIMAL SAFETY

The following are safety rules for people who work with animals.

1. Be aware of individual animal temperaments. As a stranger, approach animals with caution, and never from behind.
2. Avoid startling an animal with loud or unusual noises. Alert an animal to your approach by softly talking or whistling.
3. Avoid handling animals roughly.
4. Keep animal pens clean.
5. Do not tease animals.
6. Be extra careful around animals that have recently given birth, and their offspring.
7. Wear gloves when dealing with infected animals or areas in which these animals have been housed.
8. Be alert to avoid being caught in the middle of cattle that are bunching in a group.

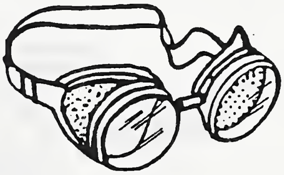
PERSONAL SAFETY

There are several pieces of safety equipment that help protect the farm worker. These should be worn in appropriate situations. The following is a description of personal safety equipment and when it is important that the farm worker use them.

HEAD PROTECTION

A hard hat offers the best protection against falling objects and protects the head against bumping. Farm workers should wear a hard hat at all times.

EYE PROTECTION



Eyes can be protected by using safety glasses, safety goggles and face shields. This eye protection should be worn in the following situations:

- when handling and applying pesticides and fertilizer
- when using hand and power tools
- when spray painting
- during welding operations
- for any job that creates dust or chaff (e.g., haying and harvesting).

Sunglasses should be used for work in bright sunlight (e.g., when driving a tractor). They will prevent eyestrain and fatigue. To increase eye protection, select sunglasses with hardened lenses. These lenses are more desirable (i.e., they are less likely to scratch or shatter).

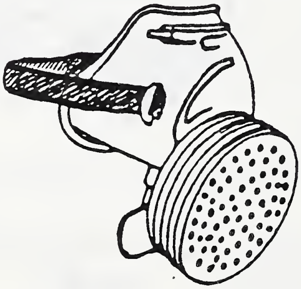
HEARING PROTECTION

Farm equipment can be very noisy; therefore, ear protection should always be worn while operating farm equipment. Ear protection can prevent the gradual loss of hearing due to exposure to loud and continuous noise.

There are two types of hearing protection: ear muffs and ear inserts. Ear muffs cover the entire ear. Ear inserts fit inside the ear.

When selecting an ear protection device, purchase those specifically designed for the job (e.g., noise protection); substitutions such as cotton and swimming earplugs will not provide adequate protection.

RESPIRATORY PROTECTION



Respiratory or lung protection procedures are important for people who work amid dust, chaff and chemicals. Similar protection may also be needed when working in silos and near large deposits of animal wastes.

Masks and/or respirators may be used to protect a worker's respiratory system. Each protective device is designed to be used in a specific situation. The choice of a mask or respirator should be based on the reason for protection. Always check with the teacher or supervisor as to what protection is appropriate and when respiratory protection is needed on a job.

HAND AND FOOT PROTECTION

Gloves protect the hands from cuts, blisters, splinters and chemical burns. Such injuries can lead to serious infections if left untreated. Rubber gloves should be worn when handling chemicals, to prevent chemicals soaking through non-rubber gloves and into the skin. Appropriate work gloves should be worn when handling wood, glass, metal and other materials that may cause cuts, splinters or other injuries.

Safety boots and shoes protect the farm worker from damage to feet or loss of toes and/or feet. Safety boots and shoes are usually made of leather, and have protective toe caps, soles and shanks.

STUDENT ACTIVITIES

1. What safety precautions are taken at the agricultural production workplace with which you are familiar? List the precautions on the following chart.

WORKPLACE: ______________________		
Machinery Safety	Animal Safety	Personal Safety

2. Safety is everyone's business and safety precautions must be practised in the home, the school and the workplace. Use the library and other resources to identify which local, provincial and federal government agencies oversee safety in the workplace. Complete the following chart with the information you collect.

Level of Government	Name of Department	Areas of Concern
Local:		
Provincial:		
Federal:		

3. The following situations require safety precautions. In small groups, discuss what safety precautions should be taken for each situation. Report the groups' safety rules to the rest of the class.

   a. Driving a tractor that is pulling a hay baler.

   ____

   ____

   ____

   b. Helping to separate three-month-old calves from their mothers, in a herd of cattle.

   ____

   ____

   ____

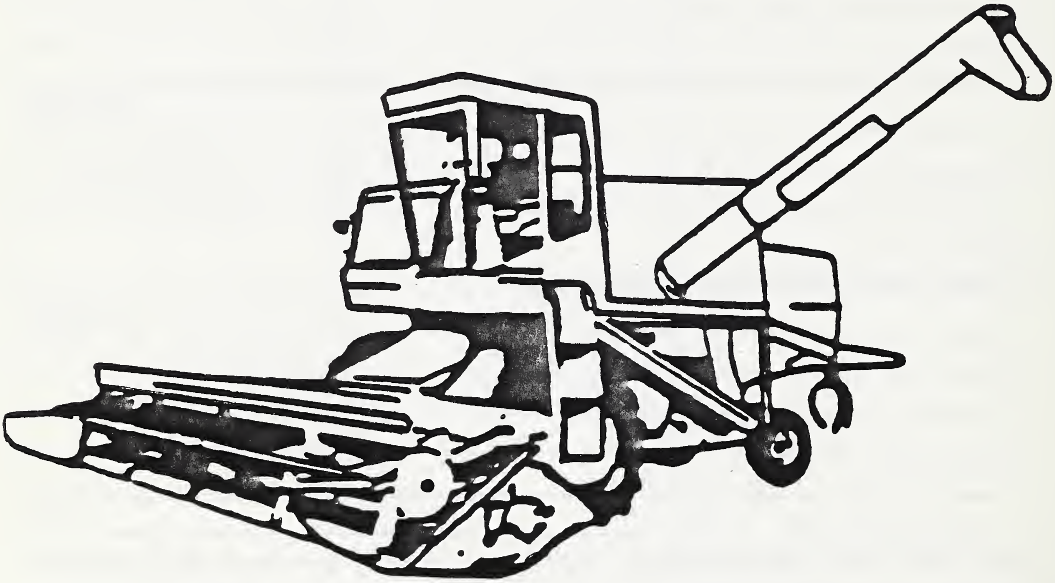
c. Repairing and painting a machine shed door.

d. Loading and hauling manure.

e. Doing regular maintenance on a grass mower.

LAND

Agricultural production depends on the land. The climate, quality of the land (i.e., the composition of the soil), and how it is farmed, are factors that determine production.



MODERN HARVESTING

STUDENT ACTIVITIES

Review the production section of the *Agricultural Production 16 Student Workbook* before answering these questions.

1. a. What type of soil is found in the area where you live?

   b. Which crops grow best in this type of soil? Why?

2. What effect do the following factors have on the land in your region?

   Climate ____________________

   Precipitation ____________________

   Temperature ____________________

   Wind ____________________

   Hail ____________________

3. a. Which factor has the most beneficial effect on the land in your community? Why?

   ____

   b. Which factors have the most harmful effect on the land in your community? Why?

   ____

THE COMPOSITION OF SOIL

The soil in which farm plants are grown is made up of five components, each of which is important to the growth of a quality crop:

- mineral content
- organic content
- air
- water
- living organisms.

MINERAL CONTENT

The mineral content of the soil includes the stones, sand, silt and clay. It is this content that gives the soil its texture and determines the ease with which the soil may be worked. The texture of the soil is determined by its content (e.g., the sizes of the many different mineral pieces that are found in the soil).

ORGANIC MATTER

The organic matter in soil helps to keep its structure and maintain its fertility.

The organic matter in soil starts as pieces of plant and insect material which are subsequently broken down into small particles. **Decay** is the process by which the organic matter is made usable for the soil. Fully decayed organic matter is called **humus**.

LIVING ORGANISMS

Soil contains many living organisms such as earthworms, insects, bacteria and fungi, which help in the breakdown/decay of the organic matter. These organisms increase soil fertility and make the land more productive for growing agricultural products.

WATER

Different types of soil hold different amounts of water. The amount of water soil can hold is called the **soil water capacity**. The soil water capacity depends upon the soil's structure. Pores in the soil structure hold water and air. Sandy soil has less water capacity than soil with a high clay content.

AIR

Air is found in the pores of soil not filled with water. Plants, like humans, need a good supply of air to grow and survive. **Soil aeration** is the term used to describe air in the soil. The amount of air in the soil depends on the soil structure. Sandy soils have an open structure and therefore are well aerated. Clay soils have very small pores that hold water and thus are poorly aerated.

STUDENT ACTIVITIES

1. Complete the following statements about the composition of soil:

   a. The __________________ organisms in soil help with the decay of ______________________ matter. As this is broken down it becomes known as __________________.

   b. Stones, sand, silt and clay make up the __________________ content of soil.

   c. Sandy soil holds less __________________ and more __________________ than clay soil.

   d. Soil __________________ is the term that refers to air in the soil.

   e. The amount of water that a soil type can hold is called the soil water __________________.

   f. Soil fertility is aided by the breakdown of the ____ __________________.

   g. Examples of living organisms in the soil include __________________, ___________________ and __________________.

   h. Soil structure or pores in the soil, help to decide how much __________________ and __________________ the soil can hold.

JOB SHEET 5
SOIL SAMPLES

Invite your local district agriculturalist to your school to perform a soil sampling demonstration. After observing how to do a soil sample, collect soil samples from different types of soil for use in classroom experiments. Complete the following information about soil samples.

1. Why do farmers take soil samples?

___

___

2. What are the best times of the year to do a soil sample, and why?

___

___

3. List the equipment used to take a soil sample.

___

___

4. Describe the method used to take a soil sample.

___

___

5. Where is the soil sample sent for testing, and why?

___

___

6. What is the cost of doing a soil sample?

___

___

7. What other things did you learn in the process of doing soil samples?

___

___

JOB SHEET 6
SOIL WATER HOLDING CAPACITY

EQUIPMENT, TOOLS AND SUPPLIES

- Soil samples (each pair of students should use a different type of soil such as clay, silt, sand and peat)
- Filter paper
- 200mL beaker
- Ring stand
- Large funnel
- Water
- Scale

PROCEDURE

1. COLLECTING INFORMATION ON WATER HELD BY SOIL

   Read the following instructions before starting. Place an asterisk beside the items that need to be recorded while conducting the experiment.

   a. Air dry the soil samples overnight.

   b. Place a filter paper in the funnel. Weigh the funnel and record the weight opposite 'e' on the record chart on the next page.

   c. Fill the funnel with soil.

   d. Weigh the filter and soil. Record this weight opposite 'b' and 'd' on the record chart.

   e. Place the funnel in a ring on the ring stand. Place a beaker under the funnel.

   f. Pour water into the funnel until the soil is saturated. Allow the excess water to drip into the beaker.

   g. Weigh the funnel and soil. Record this weight opposite 'a' on the record chart.

   h. Complete the record chart calculations and observations.

   i. Collect information from the other students to complete the class record chart.

2. CALCULATING SOIL WATER HOLDING CAPACITY

SOIL WATER HOLDING CAPACITY RECORD CHART

a. Wet soil and filter weight ________ g

b. Dry soil and filter weight minus ________ g

c. Weight of water absorbed = ________ g

d. Dry soil and filter weight ________ g

e. Filter and funnel weight minus ________ g

f. Dry soil weight = ________ g

From the above weights, calculate the water holding capacity of the soil and compare it with the soils tested by other students. The following equation is used to figure out the water holding capacity for 100g of soil.

$$\frac{\text{weight of water (c)}}{\text{dry soil weight (f)}} \times 100 = \text{water holding capacity}$$

Place the numbers from the above chart in the following equation to determine the water holding capacity of the soil you tested.

_______ ÷ _______ = _______ × 100g = ____ water holding capacity
(c) (f)

3. COMPILING A CLASS RECORD OF SOIL WATER HOLDING CAPACITY

Collect the results of other students' calculations and write them in the chart below.

Soil Sample Type	Weight of Water	Weight of Dry Soil	Water Holding Capacity Per 100g of Soil

4. OBSERVATIONS

Through observation and class discussion, answer the following questions.

a. What was the water holding capacity of the soil you tested?

____

____

____

b. Which type of soil had the highest water holding capacity?

c. Which type of soil had the lowest water holding capacity?

d. Why is water holding capacity important to the farmer?

e. Record any other observations that you made during this experiment.

f. Using the evaluation chart on the next page as a guide, evaluate your performance on this job. The chart may also be used by a classmate and your teacher/supervisor.

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Soil Water Holding Capacity	Self Evaluation	Teacher/ Supervisor Evaluation	Other
Demonstrated understanding of the experiment.			
Gathered soil samples.			
Collected all necessary materials and equipment and placed them close at hand.			
Used each item (materials and equipment) properly.			
Followed safety precautions.			
Performed proper calculations.			
Collected and recorded data from classmates.			
Described the results of each test.			
Recorded necessary data.			
Described (verbal, written) conclusions arrived at from data and test results.			
Cleaned work areas.			

Key

1	Not Acceptable
2	Average
3	Good
4	Excellent

JOB SHEET 7
ORGANIC MATTER IN SOIL

EQUIPMENT, TOOLS AND SUPPLIES

- Soil samples (each pair of students should use a different type of soil such as clay, silt, sand and peat)
- Bunsen burner
- Stirring rod
- Striker
- Oven
- Crucible
- Ring stand
- Ring
- Asbestos pad
- Tongs
- Balance

PROCEDURE

1. COLLECTING INFORMATION ON ORGANIC MATTER IN SOIL

   Read the following instructions. Place an asterisk beside the items that need to be recorded during the experiment.

   a. Completely dry the soil samples overnight.

   b. Weigh the crucible. Record the weight (in grams) opposite 'b' and 'e' on the record chart.

   c. Add about 10g of dry soil to the crucible. Weigh and record opposite 'a' on the record chart.

   d. Assemble the ring stand, ring and asbestos pad as instructed by the teacher.

   e. Set the crucible on the ring stand. Light the bunsen burner and place it under the crucible holding the soil sample.

   f. Heat the crucible until no more visible fumes are given off. This can take several hours.

   g. Allow the crucible to cool.

   h. Weigh the soil sample and crucible. Record this weight opposite 'd' on the record chart.

   i. Complete the soil composition record chart.

2. CALCULATING SOIL COMPOSITION

SOIL COMPOSITION RECORD CHART

a. Dry soil and crucible weight ________ g

b. Crucible weight minus ________ g

c. Dry soil weight = ________ g

d. Heated soil and crucible weight ________ g

e. Crucible weight (same as 'b' above) minus ________ g

f. Heated soil weight = ________ g

g. Weight of dry soil (same as 'c' above) ________ g

h. Weight of heated soil (same as 'f' above) minus ________ g

i. Loss due to heating = ________ g

3. DETERMINING ORGANIC MATTER CONTENT

From the above weights, it is possible to determine the organic matter in the soil tested. The following equation is used to calculate the organic matter in the soil.

$$\frac{\text{heated soil weight (f)}}{\text{dry soil weight (c)}} \times 100\text{g} = \%\text{ organic matter}$$

Place the numbers from the above chart in the following equation to determine the organic matter content of the soil you tested.

______ ÷ ______ = ______ × 100 = ____% organic matter
(f) (c)

4. COMPILING A CLASS RECORD OF SOIL COMPOSITIONS

Collect the results of other students' calculations and write them in the chart below.

Soil Sample Type	Weight of Dry Soil	Weight of Heated Soil	Loss	% Organic Matter

5. OBSERVATIONS

Through observation and class discussion, answer the following questions.

a. What was the organic matter content of the soil you tested?

____

____

b. Explain how the heating of the soil is a test for organic matter.

____

____

c. Which type of soil had the highest organic matter?

____

____

d. Which type of soil had the lowest organic matter?

____

____

e. Why is organic matter important to the soil and the farmer?

____

____

f. How could the organic matter of soil be increased?

____

____

g. Record any other observations that you made during this experiment.

h. Use the chart on the following page to assist you in your evaluation.

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Organic Matter in Soil	Self Evaluation	Teacher/ Supervisor Evaluation	Other
Demonstrated understanding of the experiment.			
Gathered and dried soil samples.			
Collected all necessary materials and equipment and placed them close at hand.			
Used each item (materials and equipment) properly.			
Followed safety precautions.			
Recorded necessary data.			
Performed proper calculations.			
Described the results of each test.			
Described (verbal, written) conclusions arrived at from data and test results.			
Cleaned work area.			

Key

1	Not Acceptable
2	Average
3	Good
4	Excellent

JOB SHEET 8
SOIL TYPES

1. Obtain a variety of samples and examine the soil types in your area.

2. Name the various soil types.

2. State the characteristics of each soil type.

3. State the types of crops that grow best on each soil type.

Soil Type	Characteristics	Crop
A. ______________	a. ______________	a. ______________
	b. ______________	b. ______________
	c. ______________	c. ______________
	d. ______________	d. ______________
B. ______________	a. ______________	a. ______________
	b. ______________	b. ______________
	c. ______________	c. ______________
	d. ______________	d. ______________
C. ______________	a. ______________	a. ______________
	b. ______________	b. ______________
	c. ______________	c. ______________
	d. ______________	d. ______________
D. ______________	a. ______________	a. ______________
	b. ______________	b. ______________
	c. ______________	c. ______________
	d. ______________	d. ______________
E. ______________	a. ______________	a. ______________
	b. ______________	b. ______________
	c. ______________	c. ______________
	d. ______________	d. ______________

4. Evaluate your work, using the following form.

Soil Types	Self Evaluation	Teacher/ Supervisor Evaluation	Other
Obtained soil samples.			
Described the characteristics of the various soil types.			
Correctly labelled the soil types.			
Identified the crops which grow best on each soil type.			
Cleaned work area.			

Key

1	Not Acceptable
2	Average
3	Good
4	Excellent

LAND CARE EQUIPMENT

Various pieces of equipment are used to help the farmer care for the land. They are important in keeping the land fertile and productive. Land care equipment may be used to:

- control weeds
- conserve moisture
- improve the soil structure
- prepare the land for seeding
- work organic matter and chemicals into the soil
- level areas of the land
- help prevent erosion
- aerate the soil.

Land care or TILLAGE equipment includes:

- plows
- cultivators
- harrows
- discs
- rod-weeders
- packers
- rototillers.

STUDENT ACTIVITIES

Select two pieces of land care equipment to study. Visit a farm equipment dealer to learn more about each item of equipment and complete the following chart to record information and compare the two pieces of equipment.

	1	2
Type of Equipment		
Purpose		
Sizes Available		
Operation (describe the important details of operating)		
Approximate Cost		

JOB SHEET 9
OPERATING LAND CARE EQUIPMENT

This job sheet provides the opportunity to operate equipment similar to that used in farm operations. Instead of a large tractor, you may use a garden tractor. Select two pieces of equipment to use with the garden tractor (e.g., a cultivator, a sweeper, or mower).

1. PREPARATION

a. Read the tractor operator's manual for the equipment you will be using. Become familiar with operating and safety suggestions.

b. List below the safety rules for using the tractor.

● ____

● ____

● ____

● ____

● ____

● ____

c. Have the teacher or supervisor demonstrate the use of the garden tractor.

d. Practise driving the tractor in a straight row, and turning at corners and the end of a row.

e. List the safety features for the two pieces of equipment you will be using.

EQUIPMENT SAFETY FEATURES	
Equipment: ________________	Equipment: ________________
●	●
●	●
●	●
●	●
●	●

f. List preparation needed for each piece of equipment (e.g., greasing, hook-up, adjustments).

EQUIPMENT PREPARATION	
Equipment: ____________________ ● ● ● ● ●	Equipment: ____________________ ● ● ● ● ●

2. OPERATION

a. Operate the equipment in the schoolyard or a field. Practise driving in a straight line, making turns and doing parallel rows, using the following procedure:

- drive about 10 metres straight ahead
- make a keyhole turn
- drive ahead making a row parallel to the first row
- stop.

b. Turn the equipment off. Observe the work of the equipment and complete Equipment Operation Record Sheets 1 and 2.

EQUIPMENT OPERATION RECORD SHEET 1

1. Name of the equipment:

2. Describe what you observed about the equipment's purpose. Compare the section worked by the equipment with the area not worked by the equipment.

3. Would you describe this as a piece of land care equipment? Explain your answer.

4. What type of equipment would a farmer use to do a similar task on farm fields?

5. What did you learn by operating this piece of equipment?

EQUIPMENT OPERATION RECORD SHEET 2

1. Name of the equipment:

2. Describe what you observed about the equipment's purpose. Compare the section worked by the equipment with the area not worked by the equipment.

3. Would you describe this as a piece of land care equipment? Explain your answer.

4. What type of equipment would a farmer use to do a similar task on farm fields?

5. What did you learn by operating this piece of equipment?

SOIL EROSION

Soil erosion occurs when soil particles shift from one place to another. Usually, the soil is moved by wind or some form of water such as rain or ice. On cultivated farmland, erosion may cause problems because usually the most fertile part of the soil, the topsoil, is removed. If soil erosion is allowed to continue over time, the land can lose its ability to grow crops.

When it rains hard or the snow melts quickly, the earth cannot absorb all of the water. (Puddles after a heavy rain are an example of water that is not absorbed by the earth.) As the water runs away, it carries topsoil with it. This is called **water erosion.**

On a very windy day, you may have to close your eyes against the dust because a whirlwind carrying dust is moving topsoil from one place to another. This is called **wind erosion.** Dry soil that has no plants growing in it blows away very easily because it is light and there are no plant roots to anchor it down.

SOIL EROSION CAUSED BY WIND

STUDENT ACTIVITIES

Discuss the problem of soil erosion and its causes with a farmer or a local agriculturalist and answer the following questions.

1. a. Is the farmland in the community where you live affected by soil erosion?

   ____

   b. What are the local causes of soil erosion?

   ____

   ____

   ____

   c. Why is the land not affected by other forms of soil erosion?

   ____

   ____

   ____

   d. What measures do farmers take to help prevent soil erosion?

   ____

   ____

   ____

2. a. In groups of three or four students, discuss how the effects of wind erosion on farmland may be shown.

   b. Construct an experiment to show the effects of wind on farmland.

   c. Describe the experiment.

   ____

   ____

   ____

   ____

   ____

   ____

WIND-EROSION CONSERVATION TECHNIQUES

1. Conserving moisture
2. Strip cropping or strip farming
3. Stubble mulching
4. Planting shelterbelts
5. Planting covercrops
6. Using low-till/no-till land management
7. Preventing burning
8. Preventing overgrazing
9. Using emergency tillage operations

JOB SHEET 10
OBSERVING WATER EROSION ON SOIL, DUE TO METHODS OF CULTIVATION

EQUIPMENT, TOOLS AND SUPPLIES

- Potting or garden soil
- Water
- Two large shallow pans
- Water sprinkler can

PROCEDURE

1. Place soil in the large pans.
2. Use your hands to mound the soil so it slopes away from the centre of each pan to the edges. (There should be a small hill in the centre of each pan.)
3. On one mound, use a finger to press a furrow into the soil. Start at the base of the hill and spiral the furrow to the top. The coils of the furrow should be about 1 cm deep and 2 cm apart. The mound of soil will look like a ploughed field.
4. In the second mound, run furrows in straight lines from one end of the pan to the other. Try to keep the furrows about the same depth as in the first pan.
5. Using the sprinkler can, gently and slowly pour water on the tops of the mounds, saturating the soil.
6. Observe the soil for any signs of erosion.
7. Discuss and record which method of cultivation is better for preventing soil erosion.
8. Use the following chart to assist you in your evaluation.

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Observing Water Erosion on Soil Due to Methods of Cultivation	Self Evaluation	Teacher/ Supervisor Evaluation	Other
Gathered soil sample.			
Collected all necessary materials and equipment and placed them close at hand.			
Mounded the soil properly.			
Furrowed the soil according to instructions.			
Sprinkled water gently and slowly, saturating the soil.			
Described the signs of erosion on each soil sample.			
Cleaned work area.			

Key

1 Not Acceptable
2 Average
3 Good
4 Excellent

JOB SHEET 11
OBSERVING SOIL EROSION DUE TO WATER

EQUIPMENT, TOOLS AND SUPPLIES

- Two long shallow boxes about 40 cm long, 30 cm wide and 10 cm deep
- Plastic sheeting
- Potting or garden soil
- Water
- Water sprinkling can
- Straw or grass clippings
- Large pan

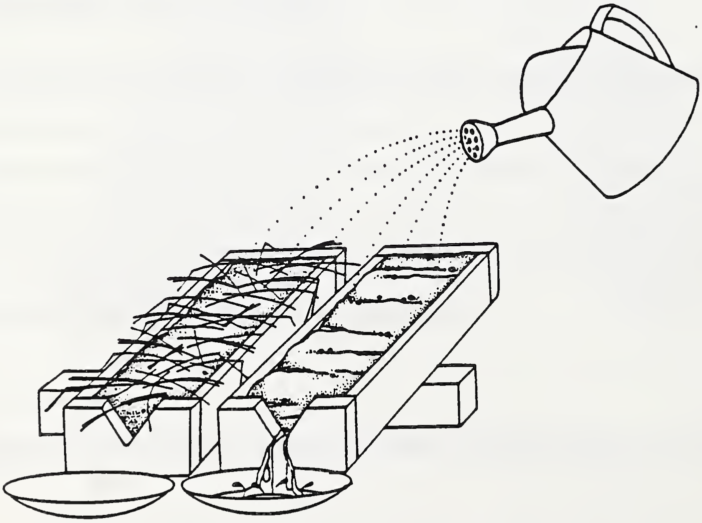
PROCEDURE

1. Cut a V-shaped notch in the end of each box as shown in the diagram below.

2. Line each box with plastic sheeting.

3. Fill the boxes with soil. Cover one box with a layer of grass clippings or straw.

4. Tilt the unnotched side of the box about 3 cm by placing it on a block of wood. The notched edge should hang over the table edge. Place a pan under the table to catch the run-off.



5. Use the sprinkler can to slowly and gently pour water over the soil in each box. Be sure to use equal amounts of water poured from the same height on each box of soil.

6. Observe the soil and the run-off for any signs of erosion.

7. Discuss:

   - Which box lost the most soil and water? Why?
   - How could a farmer use this information to help prevent soil erosion.
   - Would the results of this experiment and the previous experiment be the same if wind erosion was the problem? How would they be the same or different?

   ____

   ____

   ____

   ____

   ____

   ____

   ____

   ____

   ____

   ____

   ____

8. The following chart is to be used to evaluate your work.

From *4-H Field Crops Project Book Unit 3*, Agdex #182-80. Copyright Alberta Agriculture. Reprinted by permission.

	Self Evaluation	Teacher/ Supervisor Evaluation	Other
Collected all necessary materials and equipment and placed them close at hand.			
Gathered soil sample and clippings.			
Cut the notch correctly in each box.			
Gently poured the water over the soil in each box.			
Described the signs of erosion.			
Cleaned work area.			

Key

1	Not Acceptable
2	Average
3	Good
4	Excellent

PLANT PRODUCTION

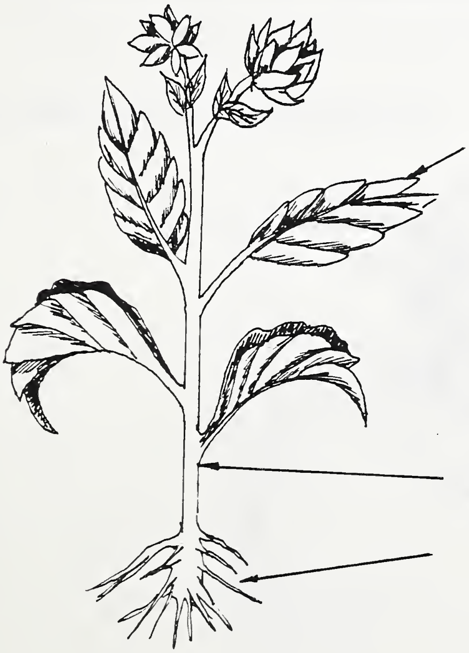
Plants are living things that need **NUTRIENTS** to grow and stay healthy. Nutrients are foods that plants take in and convert into plant tissue. (Review the section on fertilizers in the *Agricultural Production 16 Student Workbook*).

STUDENT ACTIVITIES

1. List three nutrients that plants need to grow and stay healthy.

   - ______________________________
     ____
   - ______________________________
     ____
   - ______________________________
     ____

2. Each part of the plant is important in supplying the many things that plants need to stay healthy. On the diagram below, identify the parts of a flowering plant and indicate the purpose of each part.



1. ____________________

2. ____________________

3. ____________________

3. What effect might injury or damage to each of the plant parts (i.e., those labelled 1, 2 and 3) have on the plant's growth?

   injury or damage to part 1 ____________________

   injury or damage to part 2 ____________________

   injury or damage to part 3 ____________________

HOW PLANTS LIVE

Plants have special ways of getting and using the nutrients they need to grow and stay healthy. These include:

- photosynthesis
- respiration
- translocation
- transpiration.

These four processes happen in a specific order. A process ends in change or in something different.

A plant process is a series of changes that enable the plant to live and grow. It helps to change what is available to the plant to something that the plant can use for growth.

PHOTOSYNTHESIS

Photosynthesis is the process by which a plant makes food. This means that the plant uses a number of chemicals and changes them into food. This process uses:

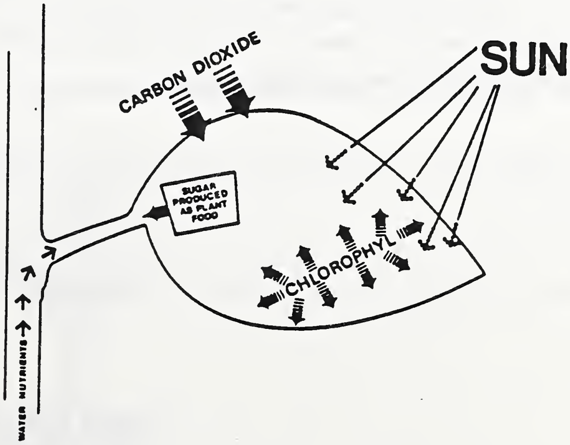
- carbon dioxide from the air
- water
- energy from light (usually sunlight)
- chlorophyll in the plant.

Photo means light.
Synthesis means to put together.
Photosynthesis means the chlorophyll uses light to put carbon dioxide and water together to make food (sugar) for the plant.

The following is the chemical equation for photosynthesis.

$$\text{Carbon Dioxide} + \text{Water} + \text{Light Energy} \xrightarrow{\text{chlorophyll}} \text{Food} + \text{Oxygen}$$

This is a picture of the process of photosynthesis.



RESPIRATION

Like animals, plants breathe. They take in oxygen. The oxygen combines with other nutrients to form energy that can be used by the plant. This process is called respiration.

The plant takes up oxygen through the roots. If the oxygen supply to the roots of a plant is limited, it will not grow properly. For example, if the soil becomes very waterlogged, there is less room for oxygen in the pores of the soil. When this happens on farmland, a farm crop may not grow well.

TRANSLOCATION

Nutrients in the plant (e.g., water, sugar, minerals) are carried through the plant from one part to another. The moving of nutrients from one place in the plant to another is called translocation. Examples of the translocation process include:

- The roots of the plant take in water and minerals from the soil. The water and minerals are carried through the stem to the leaf and flower.
- When food is manufactured in the chlorophyll of the leaf, it is then transported from the leaf to the rest of the plant to use for growth.

TRANSPIRATION

The passage of moisture through the surface of a plant's leaves is called transpiration. The temperature of plants is controlled, in part, by the process of transpiration.

Plants lose water through their leaves by evaporation. This helps to keep the plant cool. However, too much evaporation may cause the plant to dry out and die.

STUDENT ACTIVITIES

1. a. In your own words, list and describe the four plant processes.

____

____

____

____

____

b. Why are these processes important to plants?

____

____

2. Photosynthesis, respiration, transpiration and translocation are four plant processes. Complete each of the following sentences by writing the name of the process being described.

a. The process by which plants breathe is called ________________.

b. The water absorbed by the roots gets to the leaves by the process of ________________.

c. The process that occurs in the chlorophyll of the plant is called ________________.

d. The process that uses carbon dioxide, water and sunshine is called ________________.

e. In the ________________ process, oxygen and sugar make energy.

f. ________________ happens when water evaporates from the surface of the leaf.

g. The food produced by chlorophyll can be used in the stem because of the ________________ process.

h. When the plant gives off oxygen, it is because of the ________________ process.

JOB SHEET 12

PLANT TRANSPIRATION

EQUIPMENT, TOOLS AND SUPPLIES

- Two potted house plants about the same size
- Clear plastic wrap
- Plastic bag large enough to hold one plant
- Tape or elastic band
- Graduated cylinder or measuring cup
- Stick (about 8 cm longer than the height of the plant)

PROCEDURE

1. Do not water the plants for four days before starting the experiment.

2. Use a graduated cylinder or a measuring cup to water the plants. Water both plants with the same amount of water.

3. Place the stick in one pot so that it stands about 5 cm above the top of the plant.

4. Place the plant, with the stick, in the plastic bag. Seal the top tightly with an elastic band or tape. Label it No. 1.

5. On the other plant, use the plastic wrap to cover the soil surface. Do not cover the plant. Be sure that the soil is completely covered with plastic. Label it No. 2.

6. Place the plants in a sunny location. Do not disturb for four to seven days.

7. After four to seven days, remove the plastic from both plants. Complete the observations sheet on the following page.

8. Observations

a. Describe the difference in the plastic wrap that had been used to cover each of the plants.

No. 1 ____
____

No. 2 ____
____

b. Describe the soil's moisture content on the surface and just below the surface of each of the plants.

No. 1 ____
____

No. 2 ____
____

c. Use what you know about plant processes to explain what happened in this experiment.

____
____
____
____
____
____
____

9. Use the following form to evaluate your work.

Plant Transpiration	Excellent	Satisfactory	Unsatisfactory
Brought two house plants for the experiment.			
Collected all necessary materials and equipment and placed them close at hand.			
Placed the plastic properly around each plant.			
Placed the plants in a sunny location.			
Removed the plastic after the allotted time.			
Completed the observation sheets.			
Cleaned work area.			

Use a check (✓) mark to show level of performance.

STUDENT ACTIVITIES

Discuss and solve the following scientific puzzles.

1. In 1771 Joseph Priestly, an English scientist, did the following experiment. He placed a healthy mouse in a jar and covered the jar with a lid. Very soon, the mouse got sleepy and stopped running around. In a different glass jar, Priestly put a mint plant. After a few days he put the mouse in the jar with the mint plant. This time the mouse had enough oxygen to stay active for a longer time.

   What plant process was Priestly observing in this experiment?

   ____

   ____

2. If a field gets too much rain, the soil can become waterlogged. Water fills the spaces where oxygen should be. When this happens, plants do not grow well and may die.

   Using what you know about soil structure and plant processes, explain why this would happen.

   ____

   ____

3. A common scientific experiment is to place a celery stalk in a glass of water to which red food colouring has been added. In a short time, the celery stalk immersed in the water will turn red. A little while later, the part of the celery stalk not in the water will also turn red.

   What plant process is happening in this experiment? How does this help plants?

   ____

   ____

4. Sometimes plants are grown in a building. For example, a special greenhouse may be used to grow fresh vegetables in the winter. If there is not enough sunlight, greenhouse managers may need to use artificial light. Without the artificial light, the plants would turn yellow and stop growing.

   How is this explained by plant processes?

   ____

   ____

5. Working in small groups, develop your own scientific puzzle. It should have something to do with the plant processes of photosynthesis, respiration, translocation or transpiration. Consider what the answer to your puzzle means to agricultural production.

   Describe your puzzle and have classmates attempt to solve it.

   ____

   ____

   ____

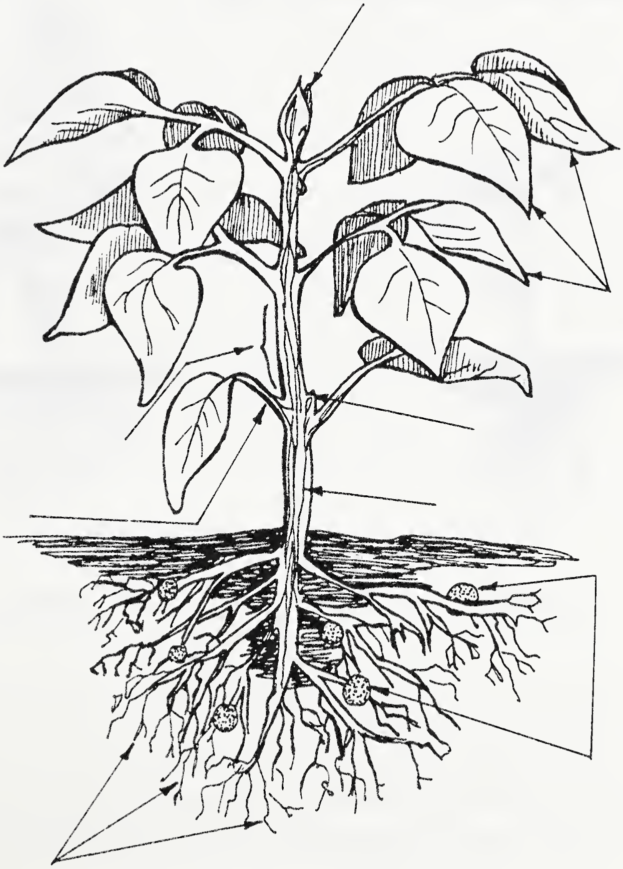
JOB SHEET 13
PARTS OF A LEGUME

1. Dig up a legume.

2. Mount the legume on a piece of cardstock with the names of its various parts.

3. Give five examples of plants that are classified as legumes.

PARTS OF A LEGUME



4. Use the following form to assist in your evaluation.

Legumes	A	B	C
Found a sample of a legume.			
Mounted the legume.			
Named the parts of a legume.			
Gave five examples of plants which are legumes.			

Key: Use a check (✓) mark to show your level of performance.

A = Excellent

B = Average

C = Unacceptable

JOB SHEET 14
ROOT TYPES

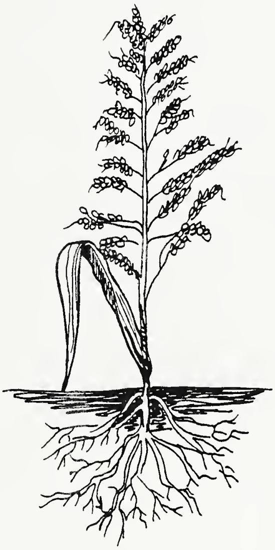
Almost all plants belong to one of two root types.

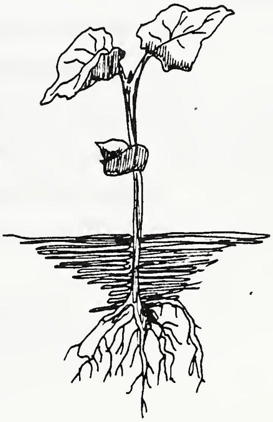
1. Dig up and mount samples of each root type.

2. Indicate the type of root of each plant below. Briefly state the characteristics of each root type.

3. Name at least five plants bearing each root type.

ROOT TYPES





Description	Description
e.g.,	e.g.,

4. Use the following chart to evaluate your performance.

Root Types	A	B	C
Found a sample of each root type.			
Mounted a sample of each root type.			
Gave examples of five plants bearing each root type.			
Cleaned up work area.			

Key

A = Excellent

B = Average

C = Unacceptable

PLANT PARTS

Plants consist of four basic parts.

Part	Purposes
1. Root	a. stores food
	b. absorbs minerals and liquids from the soil
	c. supports and feeds a plant
	d. allows perennials to live over winter
2. Stem	a. holds leaves, branches, fruit and seeds
	b. stores food
	c. assists in food production
3. Leaf	a. produces food for plant
	b. absorbs carbon dioxide
	c. transports minerals and water from roots
	d. transports food to other parts of the plant
	e. acts as food storage
	f. absorbs sunlight
4. Bud or Flower	a. stores food
	b. seed production site

JOB SHEET 15
CROP SEEDS

1. Gather seeds for the following crops and paste (tape) a small sample in each box.

a. wheat

b. corn

c. barley

d. oats

e. rye

f. alfalfa

g. canola

h. clover

i. peas

j. your choice

2. Use the chart on the next page to evaluate your performance.

Crop Seeds	Self Evaluation	Teacher/ Supervisor Evaluation	Other
Gathered seed samples for each crop.			
Mounted a sample of each seed type.			
Identified each seed sample.			

Key

1 Not Acceptable
2 Average
3 Good
4 Excellent

PLANT PRODUCTION IN ALBERTA

Several plants are grown in Alberta. They may be grown on farms, greenhouses, market gardens, tree nurseries or backyards. These plants may be grown to:

- sell as plants (trees, shrubs, flowering plants)
- sell as plant products (wheat, oats, canola)
- feed animals (hay)
- use for food (fruits and vegetables)
- use for decoration (lawn, grass, flowers).

STUDENT ACTIVITIES

1. Make a list of the plant products grown for sale by Alberta farmers. Categorize them in the chart below. (Review the Alberta plants section of the *Agricultural Production 16 Student Workbook*.)

Cereal Crops	Forage Crops	Oil Seed Crops	Vegetables	Fruits

2. Name each of the Alberta crops described below:

   a. Alberta's largest crop. It uses 20% of occupied farmland and its deliveries and sales are controlled by a national board. ______________________

   b. Alberta's second largest crop. About 50% of the crop is used to feed livestock.

   ____

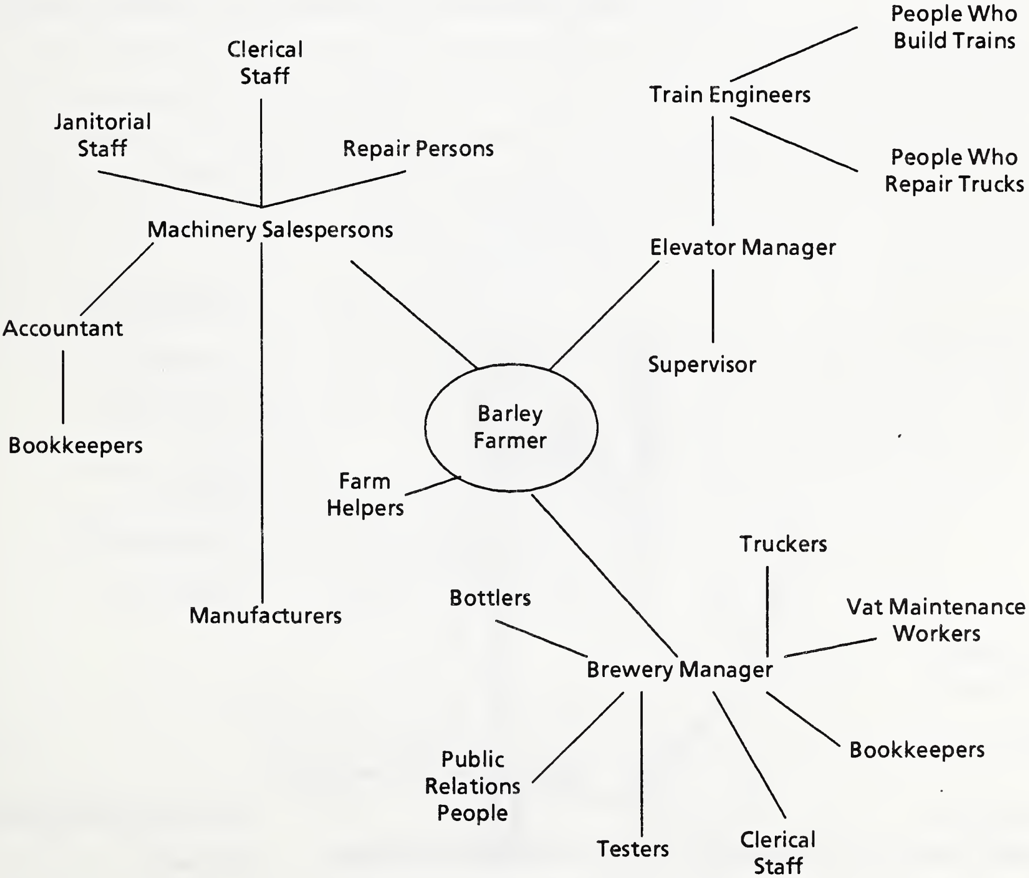
c. Alberta's third highest selling crop, an edible oil, may be used for cooking and frying.

____

d. Alberta's largest vegetable crop. ______________________________

PLANTS AND JOBS

The raising and selling of plants and plant products creates many jobs for Albertans. The following is a think map of some of the jobs created by the production and sale of barley. (A think map is a way to write down all your ideas about possible jobs and to show how these jobs relate to each other.)



STUDENT ACTIVITIES

1. Choose a plant product that is grown for sale in your community. Draw a think map of the jobs created by the production and sale of that product. After you have all your ideas down, share your map with classmates and try to add more jobs to your think map.

2. Which of the jobs in your think map is of most interest to you? Why?

____

____

____

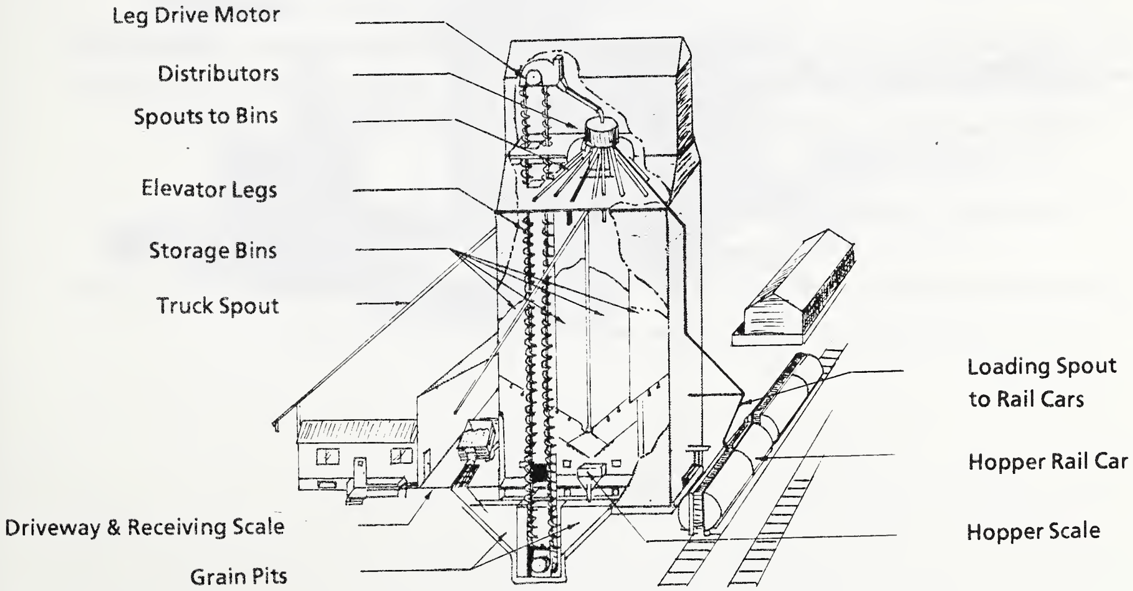
THE GRAIN ELEVATOR

Many farmers deliver their grain to an elevator where it is stored and then shipped to purchasers. Elevators have three purposes:

- to receive grain
- to store grain
- to ship grain.

STUDENT ACTIVITIES

Are there elevators in your community? If so, list their names.



PARTS OF AN ELEVATOR

HOW AN ELEVATOR WORKS

1. The farmer delivers the grain to the elevator in a grain truck. The truck and grain are weighed. The elevator manager takes a sample of the grain for grading and inspection.

2. The grain flows out of the box and into the grain pit area of the elevator. The elevator manager inspects a grain sample to decide where the grain should be stored.

3. After the grain has been unloaded and inspected, it is ready for storage. The elevator manager sets the distributor at the top of the elevator. The grain is carried from the pit to the top of the elevator in cups attached to a belt on the elevator leg.

4. The grain is dumped into the distributor which has been set so that the grain goes through a spout into the selected bin.

5. When large amounts of grain are delivered to the elevator, the grain is stored in an annex or in a very large bin. Each annex is numbered so the elevator manager can keep records of where the grain is stored.

6. The grain is taken from the bin and dropped into the hopper scale for weighing. The elevator leg lifts the grain to the top of the elevator. The grain is dropped into the distributor. The distributor is set to channel the grain to the rail car through a loading spout.

7. After storage, the grain is cleaned and loaded onto a railroad hopper car.

8. When the railroad car is full of grain, the hatches are sealed. The car is picked up by a passing train and is transported to a large terminal where the grain is sold/distributed.

JOB SHEET 16
THE GRAIN ELEVATOR

Visit a grain elevator in your community. Talk to the manager about how the elevator operates and the related jobs available. After your visit, answer the following questions about grain elevators.

1. How much grain can be stored in this elevator? ______________________________

2. What types of grain does this elevator accept? ______________________________
____

3. What are elevator managers looking for when they inspect the grain?
____
____
____

4. How does the manager grade the grain?
____
____
____

5. Where is the grain shipped from the elevator? ______________________________
____
____

6. What are the tasks of the elevator manager?
____
____
____

7. What type of training does a person need to be an elevator manager? ______________
____
____

8. Are other people employed at this elevator? Describe their jobs.

____

____

____

9. What else did you learn on your visit to an elevator?

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CROP ROTATION

Throughout the history of agriculture, farmers have tried to find new ways to get better crops. Crop rotation is one of the modern ways used to improve the quality and amount of a crop grown. It means that a farmer grows a different crop on a field every year. The rotation may include a year when the field is left as **SUMMER FALLOW**. A field is summer fallow when it is under cultivation, and no crop is grown on it for a year.

Farmers use crop rotation to protect the land so that it can continue to grow crops. Crop rotation offers the advantages of:

- helping to control plant diseases
- helping in the control of weeds
- helping to control the insect population
- improving the organic matter and nutrient level of the soil
- helping in the control of soil erosion.

Farmers may also use crop rotation to protect the farm business. When one product is expected to have a low selling price, the farmer may choose to grow a higher selling product.

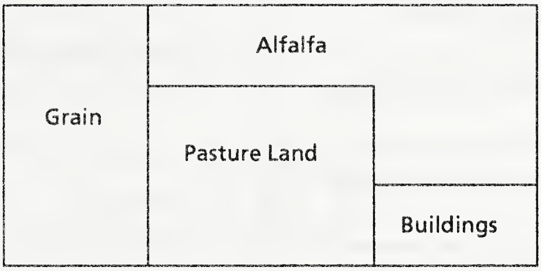
JOB SHEET 17
CROP ROTATION

Visit a farm to learn about crop rotation. Interview the farmer and on a separate sheet of paper complete the following information about crop rotation on the farm.

1. At the top of each box, write the legal land description for the field.

2. Draw a box 8 cm x 10 cm to show the different crops that the farmer grows.

   For example:



3. Find out what the farmer has grown in each field for the last four years.

4. Record the land use for each field. The following is an example.

Legal description: SW 17 50 24 W4

Crop Description

1986: Neepawa Wheat
1987: Conquest Barley
1988: Galt Barley
1989: Summer Fallow

5. Ask the farmer why different crops were grown and about the decision to summer fallow. List the reasons for this:

Crop	Reason

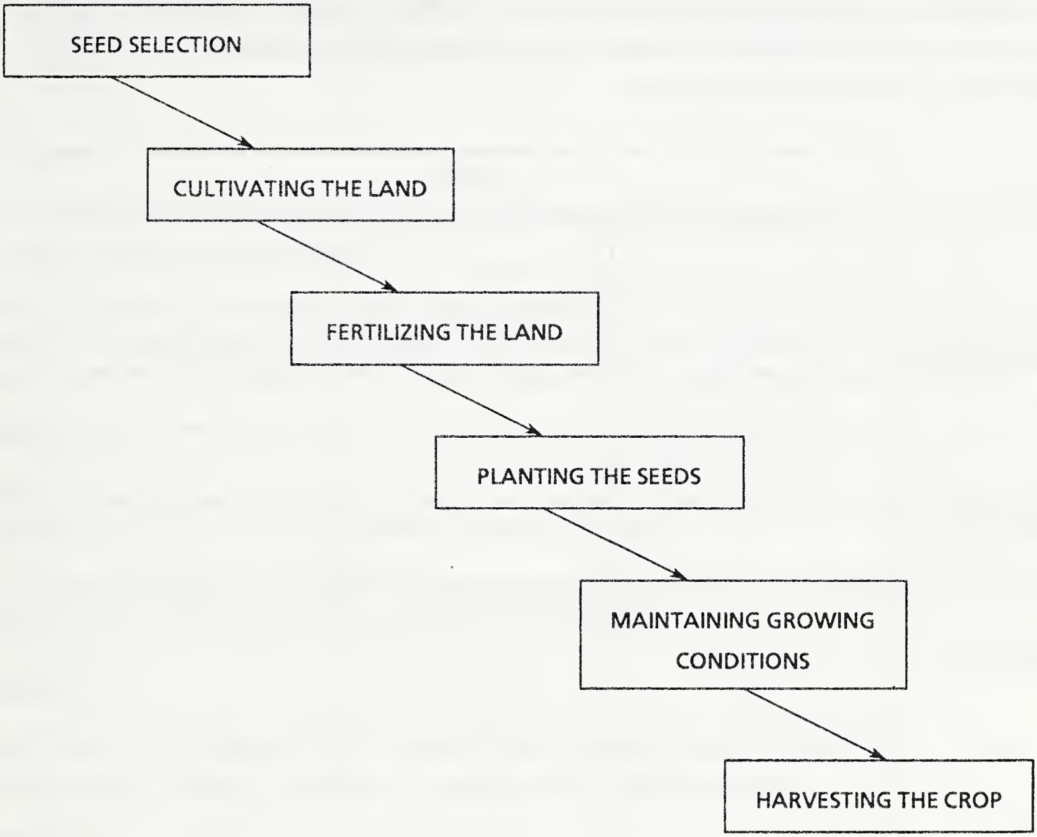
6. Ask the farmer about seedbed preparation of the land for crop rotation. You may wish to ask about the equipment used, the steps followed, and soil testing. **Write a brief report on your findings and clip it to this page.**

7. Use the following chart to evaluate your performance.

Plant Transpiration	Excellent	Satisfactory	Unsatisfactory
Completed interview with farmer.			
Correctly wrote the land description on the diagram.			
Drew the various fields on the diagram.			
Wrote down the crops grown for the last four years.			
Wrote down the reasons why different crops were grown.			
Wrote a report about seedbed preparation.			

CROP MANAGEMENT

Crops are grown every year following a step-by-step plan. This is called **CROP MANAGEMENT**. The steps in crop management are shown in the following chart.



From *Agriculture and Me* by N. Hochachka. Copyright 1987 by Alberta Agriculture. Reprinted by permission.

STUDENT ACTIVITIES

Use the following chart to list and compare the equipment, tools and supplies used in growing crops. Select three crops to study. Choose at least one cereal crop (e.g., wheat, barley or oats), one vegetable crop (e.g., potatoes, lettuce, mushrooms) and any other crop grown in the area where you live. Write the name of each crop beside the numbers 1, 2, and 3 on the top of the chart. In each column, list the equipment used for each step in crop management to grow that crop. (Visits to local farms will help you to complete this activity.)

	CROPS		
	1	2	3
Seed Selection			
Cultivation			
Fertilizing			
Planting			
Maintaining Growth			
Harvesting			

CROP PROTECTION

Crop protection is an important part of maintaining growing conditions. Farmers want to protect the crops from damage so that there are good yields. Farmers must also protect themselves from the loss of income that occurs when a crop does not survive until harvest. Potential dangers to crops include:

- weather
- weeds
- insects
- diseases.

WEATHER

The weather has a major effect on farming. Weather conditions that most affect farming include rainfall, temperature, wind, and hail.

The right amount of moisture and the correct temperature are needed for a crop to grow and mature. Too much wind can dry out the land and cause soil erosion. Hail may damage or destroy a crop. In general, poor weather conditions, such as lack of sufficient sunshine, will lower crop yields.

WEEDS

Weeds are wild plants growing where they are not wanted. Weeds compete with the crop for soil nutrients, moisture, and light and, therefore, lower the crop yield.

If weeds are present during harvest, they lower the quality of the crop. The grain may be docked (given a lower quality rating) for having weed seeds mixed with it.

INSECTS

Some insects eat or damage a crop. These are called insect pests. One example is the grasshopper. Insect pests will lower the crop yield or completely destroy it, just as weeds do.

DISEASE

Plants can be affected by diseases. The best known example of this was the potato famine in Ireland many years ago. For two years in a row, the potato crop failed because of a potato blight, and the resulting famine had a devastating effect on the Irish people who depended on the potato as a major food source.

Plant diseases can affect the germination, root development, and growth of a plant. They may kill the plant or lower the quality and yield of the crop.

STUDENT ACTIVITIES

Beside each of the following stories or pictures indicate which danger to crops is threatened (e.g., weather, insect pests, disease, and weeds).

Canola needs worm check

By **RIC SWIHART**

LETHBRIDGE, Alta. (Special) – Southern Alberta farmers should check canola fields immediately for diamondback moth worms, said Blair Shaw, regional crop production specialist for the Alberta agriculture department.

The worms are about one-quarter of an inch long, and as thick as a pencil lead. Canola plants should be checked carefully, and the worm may be spotted hanging from a silver thread it exudes as an escape measure.

Shaw said two to three worms per plant or 250 per square yard are enough to warrant chemical spray control.

Late-seeded canola is most susceptible because it will be exposed to worms the longest.

Crop danger: ______________________

Crop danger: ______________________

Crop Reports

ALBERTA: Hot, dry weather last week stressed crops in southern Alberta, but provided some relief to northern crops with adequate to excessive moisture, according to the Alberta Wheat Pool.

Four percent of the spring wheat was ripe and 39 was filling. Barley was four percent ripe and 35 percent filling and canola was one percent ripe and 39 percent in the pod stage. Crop deterioration continued in most areas because of excessive heat and inadequate moisture.

Crop ratings, compared with 100 percent optimum, were: hard red spring wheat 80 percent; soft white spring wheat 88; winter wheat 61; durum 68; oats 89; barley 87; linseed 75; rye 60; and canola 86.

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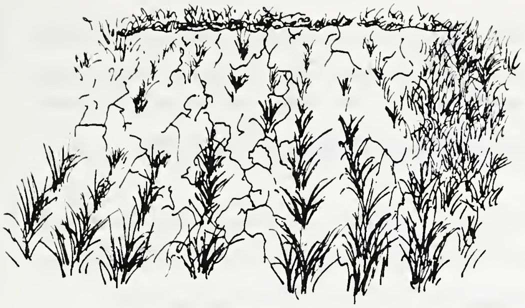


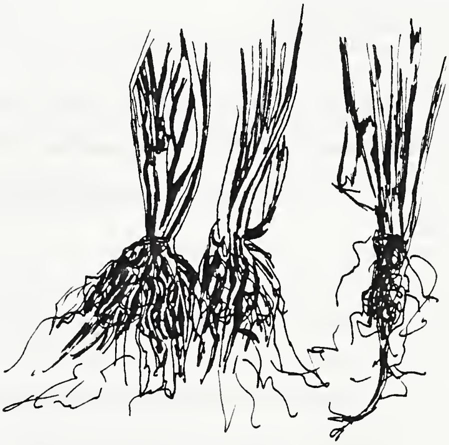
Symptoms: Distinct banding of emerging seedling leaves white bands called rugby stocking on the newest part of the leaf. Damage is most severe in lower parts of grain fields.

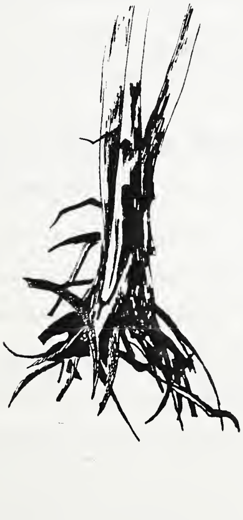
Crop danger: ____________________

Symptoms: Small brown marks (lesions) develop on the lower leaf sheaths, root, or below-ground stems. Lesions may get larger and grow together resulting in the entire crown area constricting and turning brown.

Infected plants may be stunted, lack vigour with browning of the crown, stem bases and leaf sheaths. When infection occurs at the seedling stage, young plants may be stunted or killed.

Crop danger: ____________________





Symptoms: Early symptoms is an internal brown discolouration of the lower stems. Infected roots and crowns are dark brown to shiny charcoal black. Severely diseased plants are stunted, produce few tillers, develop white heads and die prematurely. Affected plants that occur singly or in patches throughout the field can be uprooted easily.

Crop danger: ____________________

CROP INSURANCE

Crop insurance is one way farmers can protect their income against the potential dangers to crops. While not all dangers to crops can be insured, the most common insurance is hail protection.

Shortly after planting a crop, the farmer may choose to buy hail insurance. If there is hail damage to the crop, an insurance adjuster will inspect the damage. Based upon the extent of the damage and the insurance coverage, the farmer will receive some compensation for the lost/damaged crop.

STUDENT ACTIVITIES

1. Discuss how insurance can protect people and their property. After the discussion, describe an insurance policy held by you or a member of the family (e.g., car insurance, medical insurance, loss of work or property insurance). Include its purpose, the protection it offers, and how the cost is decided.

2. Interview an Alberta hail and crop adjuster. Use the following questions as a guide to learn more about crop insurance. Record the adjuster's responses to each question.

   a. For what types of dangers can farmers buy crop insurance?

   b. Do all farmers buy hail insurance? Why or why not?

   c. How does the adjuster know if there has been hail damage to a crop?

   d. How does the adjuster decide how much money to give the farmer for hail damage?

   e. What other ways, beside insurance, do farmers use to protect themselves against crop damage?

JOB SHEET 18
PLANNING AN INDOOR CROP

Some crops are grown indoors. For example, a greenhouse may be used to grow vegetables such as cucumbers, tomatoes, or lettuce. Practise the steps of crop management by planning and growing an indoor crop.

Start by planning the indoor crops to be grown. Under each step of the procedure below, list the equipment, tools and supplies necessary for that step.

(Review the plant production section of the *Agricultural Production 16 Student Workbook* before answering these questions.)

PROCEDURE

1. SEED SELECTION (Include type and variety of seeds chosen, source, cost, germination test information)

   ____
   ____
   ____
   ____
   ____

2. CULTIVATING THE LAND (Describe what you intend to do to ensure that the soil is ready to grow the crop)

   ____
   ____
   ____
   ____
   ____

3. FERTILIZING THE LAND (Include type, source, and cost of fertilizer, and safety rules for application)

   ____
   ____
   ____
   ____
   ____

4. PLANTING THE SEEDS (List and describe the steps to be taken)

5. MAINTAINING THE GROWING CONDITIONS (Describe what must be done to keep the crop healthy and growing)

6. HARVESTING (Describe the equipment and personnel needs)

7. STORAGE AND MARKETING (Include plans for selling the product)

JOB SHEET 19
GROWING AN INDOOR CROP

After completing the planning job sheet, grow the indoor crop. If this is to be a group project, different tasks in the plan may be performed by each member of the group. Keep the following records:

1. **General Management Records**

Planting date: ____________________

Harvesting date: ____________________

Number of days to grow each crop: ____________________

2. **Crop Management Records**

Soil test results: ____________________

Germination test results: ____________________

Problems experienced during growing period: ____________________

____

Chemicals used:

- weed control ____________________
- insect control ____________________
- disease control ____________________

Other observations: ____________________

____

3. Use the following chart to evaluate your performance.

	Self Evaluation	Teacher/ Supervisor Evaluation	Other
Planned an indoor crop.			
Kept a record of steps taken and the results.			
Conducted soil tests.			
Completed germination tests.			
Cultivated the soil.			
Planted the seeds.			
Maintained weed control.			
Maintained insect control.			
Maintained disease control.			
Maintained growing conditions.			
Harvested crop.			
Planned storage and marketing.			
Cleaned up work area.			

Key

1 Not Acceptable
2 Average
3 Good
4 Excellent

DEMONSTRATION PLOTS

Demonstration plots are grown to test new ideas in farming. Each plot is used to produce a small crop. These crops show how a new product or method will improve production. They may also be called test plots. Government agencies, universities, and seed producers use these plots to experiment with crops and improved crop management procedures.

STUDENT ACTIVITIES

1. Contact your county agricultural fieldman or the district agriculturalist to find out about the demonstration/test plots in your community. List below the crops being tested.

2. Visit a demonstration/test plot to observe how it is set up and operated. Describe the set-up and operation.

JOB SHEET 20

PLANNING A DEMONSTRATION PLOT

As a class or group project, plan and grow a demonstration/test plot. Start by finding a location for the plot and by planning to grow crops common to your community. Under each step of the procedure below, list the equipment, tools and supplies necessary for that step.

PROCEDURE

1. SEED SELECTION (Include the crops and varieties to be grown)

   ____
   ____
   ____
   ____
   ____

2. CULTIVATING THE LAND (Describe what you intend to do to ensure that the demonstration/test plot is ready to grow the crops)

   ____
   ____
   ____
   ____
   ____

3. FERTILIZING (Include how you will decide if fertilizer is necessary)

   ____
   ____
   ____
   ____
   ____

4. PLANTING (What equipment and personnel are needed? What weather conditions are conducive to planting?)

____

____

____

____

____

5. MAINTAINING THE GROWING CONDITIONS (Include the tasks, when they should be done, and how often the crops should be checked for growth and damage)

____

____

____

____

____

6. HARVESTING (Include the possible markets for selling the product from each crop)

____

____

____

____

____

JOB SHEET 21
GROWING A DEMONSTRATION PLOT

After completing the planning job sheet, grow the demonstration crops. If this is to be a group project, different tasks in the plan may be performed by each member of the group. Keep the following records:

1. **General Management Records**

Planting date: ____________________
Harvesting date: ____________________
Number of days to grow each crop: ____________________

2. **Crop Management Records**

Soil test results: ____________________
Germination test results: ____________________
Problems experienced during growing period: ____________________
____
Chemicals used:
- weed control ____________________
- insect control ____________________

Other observations: ____________________
____

3. Use the following form to evaluate your performance.

Growing a Demonstration Plot	Excellent 4	Good 3	Average 2	Not Acceptable 1
Planned a demonstration plot.				
Kept management records.				
Selected crop seeds.				
Cultivated land.				
Fertilized when necessary.				
Planted seeds.				
Maintained growing conditions.				
Maintained weed control.				
Maintained insect control.				
Maintained disease control.				
Harvested crop.				
Planned storage and marketing.				

Key

1	Not Acceptable
2	Average
3	Good
4	Excellent

JOB SHEET 22
IDENTIFYING FERTILIZERS

1. Visit an elevator or a local grain farmer in your area to determine the various fertilizers in use today. Fill in the chart below.

Fertilizer Name	How and When Applied	Reason for Use

2. Use the form on the next page to evaluate your performance.

Fertilizer	Excellent	Satisfactory	Unsatisfactory
Visited a local farmer or elevator.			
Obtained names of fertilizers.			
Described how fertilizers are applied.			
Described when fertilizers are applied.			
Described why fertilizers are applied.			

JOB SHEET 23
CROP PESTS AND DISEASES

Visit a local farm or grain elevator in your area to determine the types of crop pests and diseases that may be present in your area. Use the information to answer the following questions.

1. What is a crop pest?

   ____

2. List three types of crop pests.

   ____

   ____

   ____

3. What harm is caused by each of the crop pests?

Pest	Harm

4. What methods are used to control pests.

Pest	Method of Control

5. What is an insecticide?

   ____

   ____

6. a. List two types of crop diseases.

   ____

   ____

b. how would you recognize each disease?

Disease	Disease Indicator(s)

c. List causes of the two plant diseases.

Disease	Cause

7. State at least two methods of controlling plant diseases.

8. What health and safety practices must be followed when handling pesticides and herbicides? For example, protective clothing that must be worn.

9. How should pesticides and herbicides be stored?

10. Use the following chart to evaluate your performance.

Crop Pests and Diseases	Excellent	Satisfactory	Unsatisfactory
Defined crop pest.			
Listed three types of crop pests.			
Described the harm caused by each type of crop pest.			
Stated the methods of controlling crop pest.			
Defined an insecticide.			
Listed two type of crop diseases.			
Described an indication of each crop disease.			
Listed causes of two plant diseases.			
Gave two methods of controlling plant diseases.			
Listed safety devices.			
Described storage methods.			

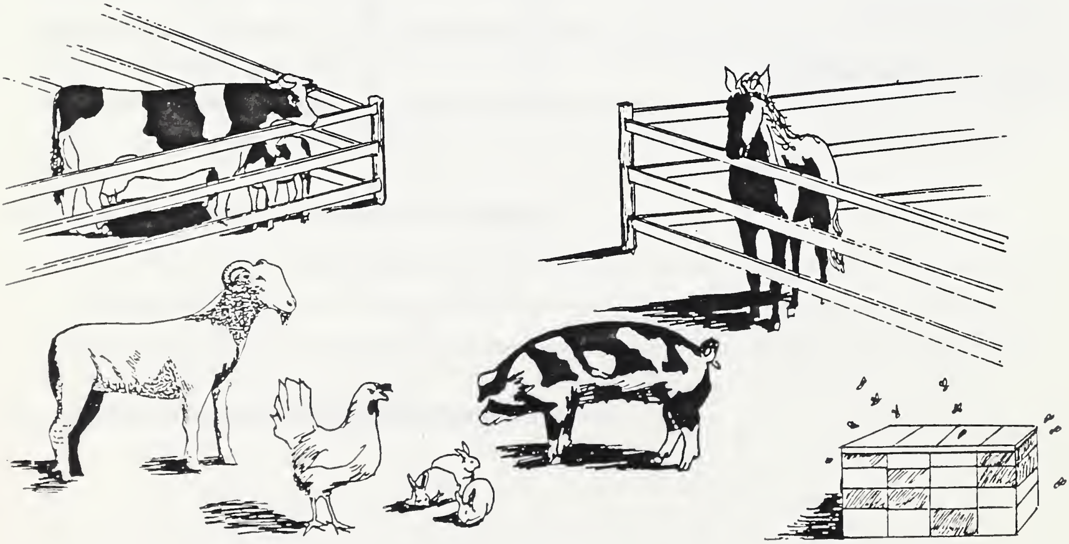
LIVESTOCK PRODUCTION

Alberta farmers raise many animals. Domesticated farm animals are called livestock. Livestock production in Alberta includes the following animals:

- cattle (beef and dairy)
- pigs (swine)
- sheep
- poultry (chickens, turkeys, ducks, geese)
- goats
- horses.

Some types of farming involve animals and insects not usually called livestock. Examples of this type of farming are:

- beekeeping
- fur farming
- rabbit farming.



NEEDS OF ANIMALS, FOWL, AND INSECTS

Like all living things, animals, food, and insects need nutrients to survive. The basic needs of animals include:

FOOD

Animals require a balanced diet. The farmer plans their feed to provide the nutrient needs of the animal. Sometimes a pre-mixed ration is fed to animals.

WATER

Farmers must sometimes plan special ways to get water to the animals. For example, in the winter water must be kept from freezing so the animals can drink it.

SHELTER

Different types of shelter are needed for different animals, fowl, and insects. Some animals are kept in barns for a short time, while other animals are always kept in a barn. These latter animals are said to be raised in confinement.

ANIMAL GROUPS

Farmers raise many types of animals. Each type of animal is raised for a different purpose. For example, cattle may be part of a dairy or a beef herd. Dairy cattle are usually raised for the production of milk, and a beef herd is usually raised for meat production. Similarly, a beef operation may be set up just as a feedlot, or it may be a combined feedlot and cow-calf operation.

A farmer who has both a dairy and a beef operation hopes to produce and sell the following items from each operation:

Dairy

- fluid milk
- replacement animals
- veal

Beef

- breeding stock
- cow-calf
- fat cattle

Farm animals are usually raised for either breeding or sale. Sometimes the animal is sold; at other times, something that the animal produces may be sold (e.g., chickens may be sold as fryers and broilers or raised as layers, and their product, eggs, sold).

STUDENT ACTIVITIES

1. Most types of the animals, fowl, and insects raised on Alberta farms are listed below. Describe why farmers might raise each type.

CATTLE ______________________

SWINE ______________________

CHICKENS ______________________

GOATS ______________________

FUR-BEARING ANIMALS ______________________

BEES ______________________

TURKEYS ______________________

SHEEP ______________________

RABBITS ______________________

HORSES ______________________

2. a. Brainstorm and list the types of livestock produced in your community.

   ____________________ ____________________
   ____________________ ____________________

   b. Use other sources of information to add to your list of livestock. For example:

   - Ask people in your community for information.
   - Check the local newspaper for ideas.
   - Talk to the staff of the Alberta Agriculture office in your district.

   ____________________ ____________________
   ____________________ ____________________
   ____________________ ____________________

3. List some of the products that humans use from the livestock raised in the community. For example, sheep production provides mutton and wool.

Livestock	Products Used

4. a. The livestock production industry uses some special terms. Using a variety of resources, define the following terms.

   b. In which part of the livestock industry does each term apply?

Term	Definition	Section of Industry
Apiary		
Breed		
Farrow		
Layers		
Fodder		
Quota		
Herd		
Bedding		
Polled		
Incubator		
Veterinarian		
Brooder		
Graze		
Feedlot		
Silo		
Poultry		
Shear		
Sire		
Wean		
Livestock		

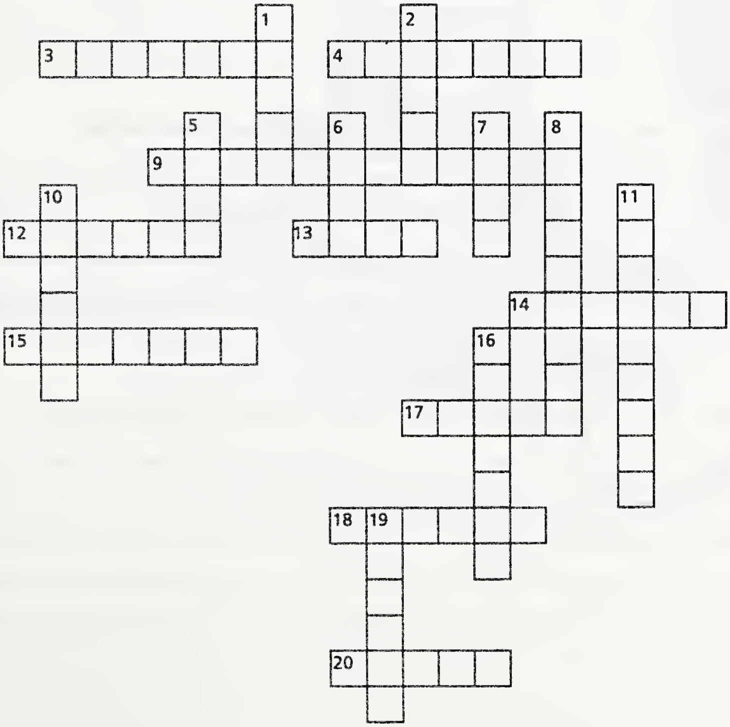
5. Complete the following crossword puzzle. Use one of the terms listed in the previous student activity by responding to each clue.

ACROSS

3. a heated place for newly hatched chicks
4. domesticated fowl like turkeys and chickens
9. animal doctor
12. cattle that do not grow horns
13. to separate a young animal from its mother
14. chickens raised to lay eggs
15. straw that animals sleep on
17. to take the wool off a sheep
18. newborn pigs
20. animals that are alike

DOWN

1. to feed on growing grass or pasture
2. the amount of milk a dairy accepts from a farmer
5. a group of animals
6. male parent of an animal
7. storage building for green hay
8. a machine that keeps eggs warm for hatching
10. food, like hay, for animals
11. domesticated animals
16. a small area of land where large numbers of animals are raised
19. where beehives are kept



JOB SHEET 24
LIVESTOCK PRODUCTION

Visit a livestock producer in your area. After your visit, complete the following information.

1. What types of livestock are raised on this farm? What is the purpose of each type of livestock raised?

2. What food is fed to each type of animal?

3. What type of shelter is provided for each type of animal, fowl, and insect raised?

4. Are special arrangements needed to supply water to the livestock? Describe them.

5. What other things about livestock production did you learn on your visit?

6. Use the form on the next page to evaluate your work.

Livestock Production	Excellent 4	Good 3	Average 2	Not Acceptable 1
Visited a livestock producer.				
Listed types of livestock raised.				
Listed purpose of raising each kind of livestock.				
Listed the food fed to each animal.				
Described the shelter provided for each animal.				
Described watering facilities.				

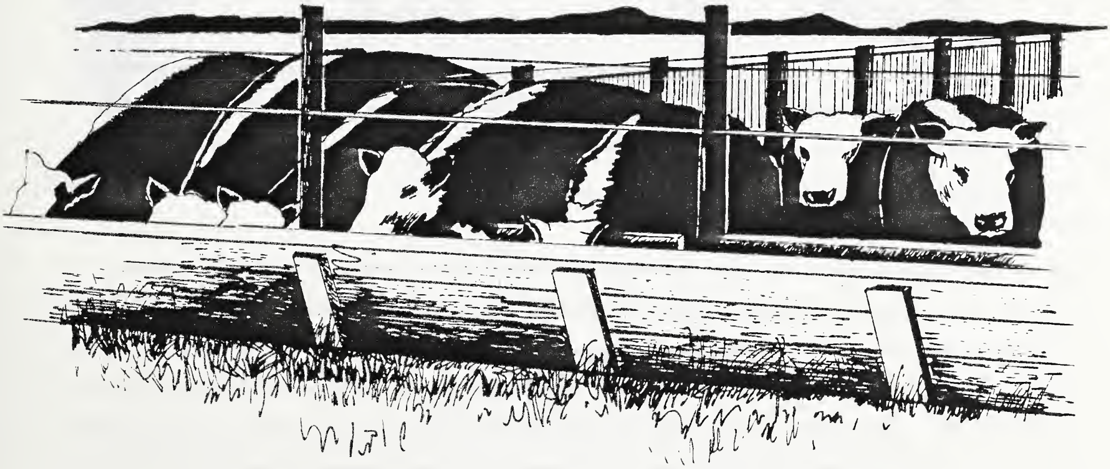
Key

1	Not Acceptable
2	Average
3	Good
4	Excellent

LIVESTOCK PRODUCERS

Raising livestock is a big responsibility. Animals, fowl, and insects may need to be cared for every day of the year. The livestock producer is responsible for the care and well being of each type of livestock being raised. Some of the tasks of a livestock producer include:

- feeding
- watering
- providing health care
- building and repairing shelters and confinement areas
- collecting livestock products (e.g., milk, eggs)
- cleaning the livestock's shelters
- collecting or buying food
- maintaining records of growth and reproduction
- buying and selling stock
- identifying livestock through branding or ear tagging.



STUDENT ACTIVITIES

Choose an animal, fowl, or insect that is part of livestock production in the area where you live. Make a list of the tasks that must be done to care for that livestock.
(**Note**: You may use books about raising this animal and talk to local livestock producers.)

1. List of care tasks for a(n) ______________________________ in order of importance.

2. Why is the farmer raising this livestock?

3. What special problems may be encountered in ________________ production?

____

____

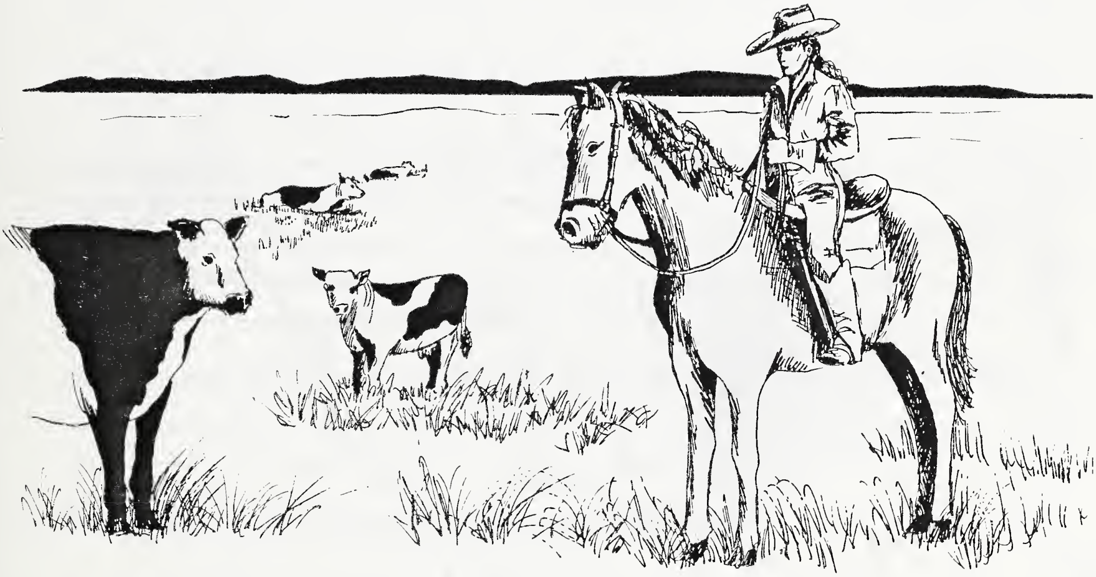
____

4. What equipment is required for ________________________ production?

____

____

____



STUDENT ACTIVITIES

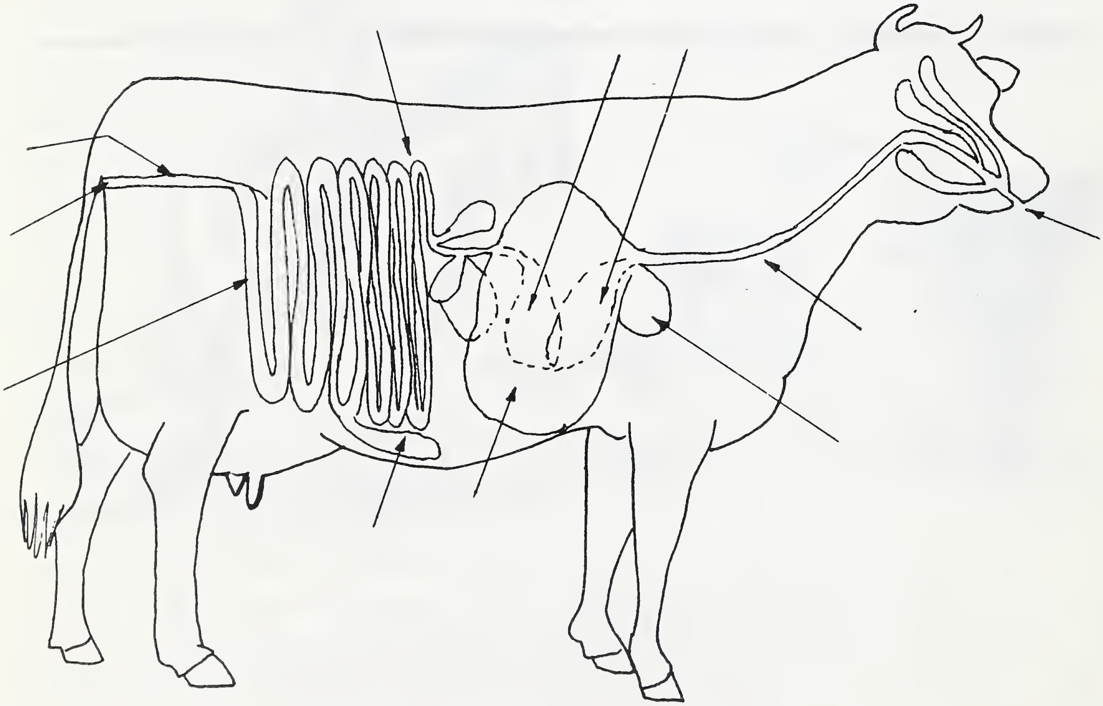
1. What is a ruminant?

____

____

2. The following drawing shows the major parts of the digestive system of ruminants. Label the diagram.

MAJOR PARTS OF THE DIGESTIVE SYSTEM OF RUMINANTS



JOB SHEET 25
LIVESTOCK

By visiting a farmer, conducting research or talking to your local district agriculturalist, answer the following questions.

> In the livestock industry, both the imperial system and the metric system are used; e.g., beef and sheep are sold as price/lb; swine is sold as price/kilo.

1. What is the difference between a ruminant and a non-ruminant?

2. A certain amount of energy is required to maintain an animal's body weight. What is the daily net energy necessary for a 1 000 lb. cow to maintain its weight?

3. What is the daily net energy necessary for a 900 lb. steer to allow a weight gain of 2 lb. a day?

4. What purpose do the following nutrients serve in an animal's food?

   a. water ______________________
   b. protein ______________________
   c. carbohydrates ______________________
   d. fats ______________________
   e. minerals ______________________
   f. vitamins ______________________

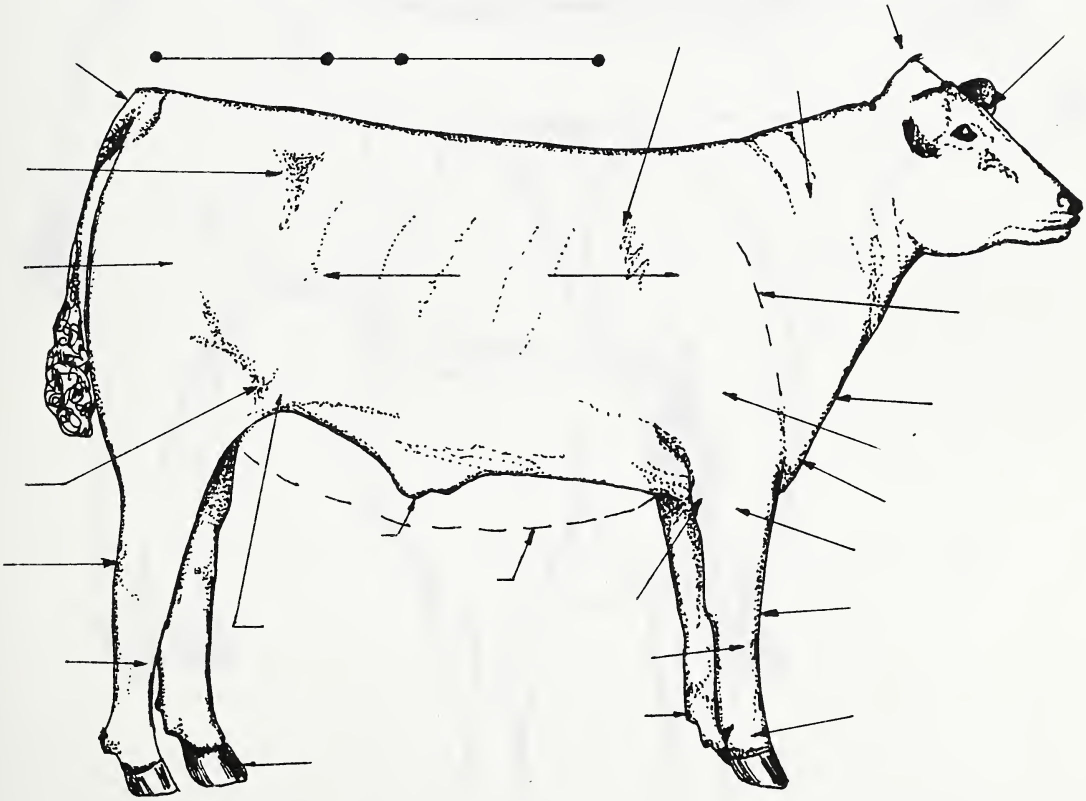
5. Use the following form to evaluate your work.

Livestock	Excellent	Satisfactory	Unsatisfactory
Described the difference between a ruminant and non-ruminant.			
Was able to determine daily energy required to maintain body weight.			
Was able to determine daily energy required for weight gain.			
Described the purposes of various nutrients in animal's food.			

STUDENT ACTIVITIES

Using in-class and other resources, label the following diagram.

PARTS OF A BEEF ANIMAL



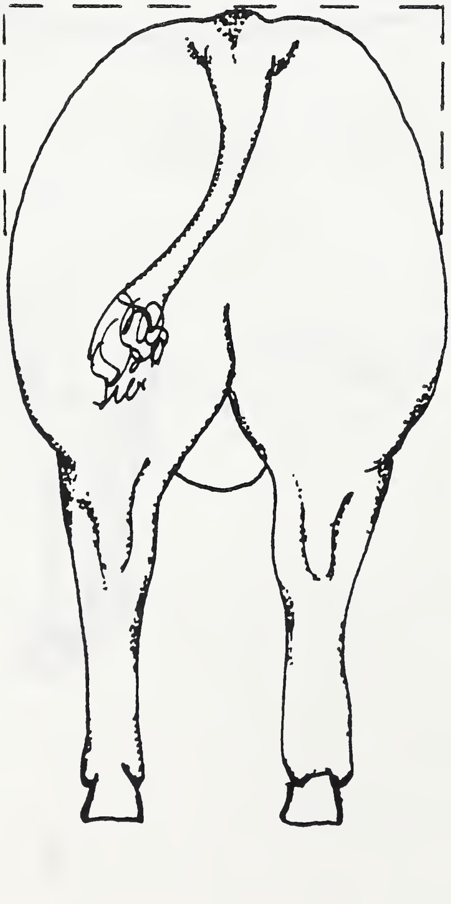
JOB SHEET 26
INDICATORS OF FINISH

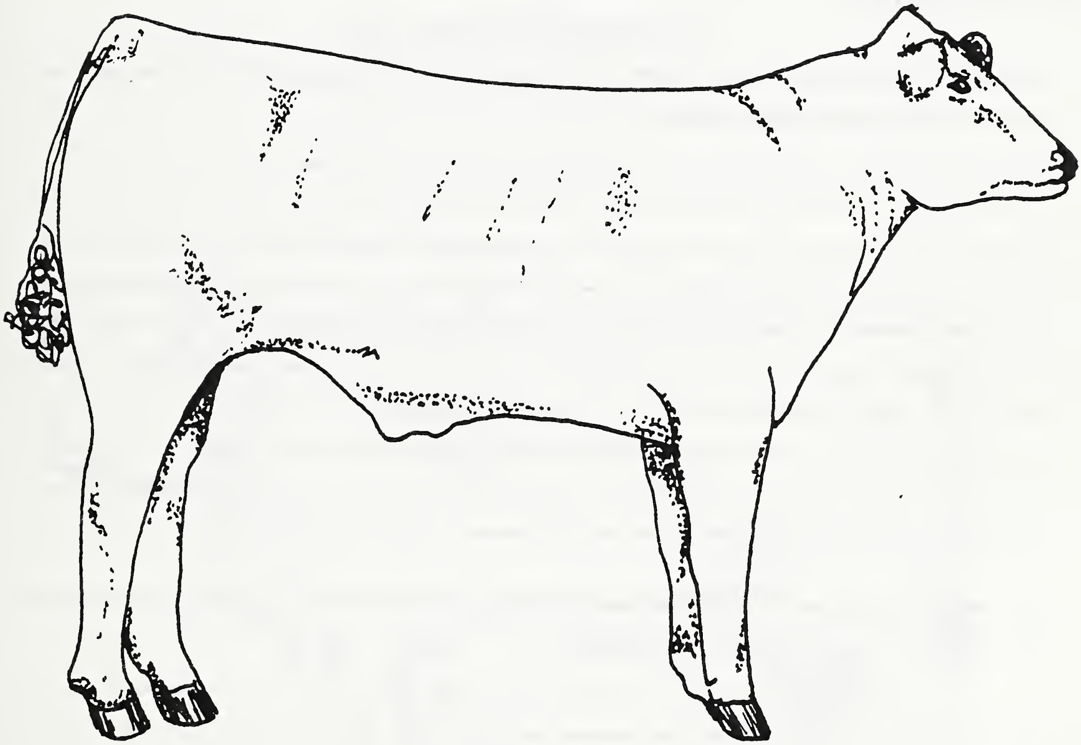
1. Visit a local beef farmer in your area to determine the preferred characteristics of a good market beef. The preferred characteristics are indicators of finish. That is, they are qualities that determine the beef is ready for market.

2. On the following diagrams, mark the indicators of a finished market beef.

3. Use the evaluation chart on the next page to evaluate your work.

INDICATORS OF FINISHED MARKET BEEF





Indicators of Finish	Excellent	Satisfactory	Unsatisfactory
Visited a beef farmer.			
Pointed out all indicators of finish.			
Described the characteristics of a finished beef.			

DISCUSSION QUESTIONS

1. If the beef animals you saw on the farm, which breeds of animals do you feel would be best fed out as fat market cattle? Explain why.

2. If you were raising cattle for a cow-calf operation what breed of cattle do you think would result in the best return on your dollar? Explain why.

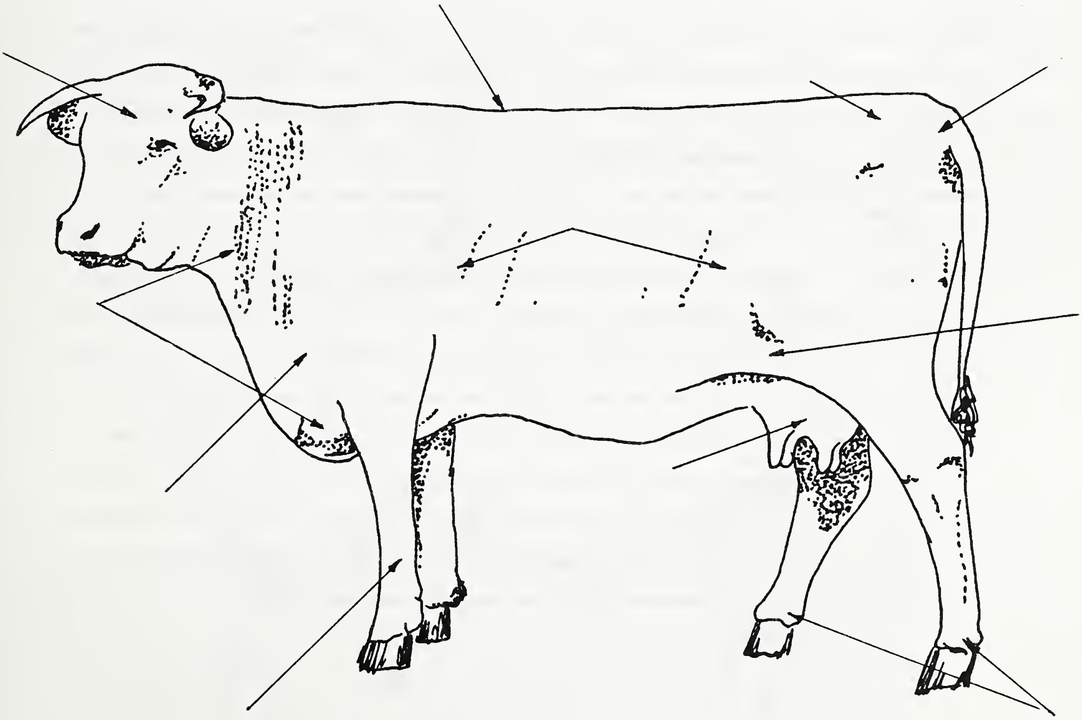
JOB SHEET 27
IDEAL CHARACTERISTICS OF A COW

1. Visit a local cow/calf or dairy operation in your area to determine the ideal characteristics of a cow.

2. On the following diagram, label the ideal characteristics of a cow.

3. Use the evaluation chart to evaluate your work.

IDEAL CHARACTERISTICS OF A COW



Ideal Characteristics of a Cow	Excellent	Satisfactory	Unsatisfactory
Visited a local cow/calf or dairy operation.			
Labelled the ideal characteristics of a cow on the diagram.			
Described the ideal characteristics of a cow.			

DISCUSSION QUESTIONS

1. Assume you are starting a dairy herd. What breed of cattle would you purchase? Explain why. Would you purchase the same breed if you were raising the heifers to build up a larger herd? Explain why.

JOB SHEET 28
IDEAL CHARACTERISTICS OF A BULL

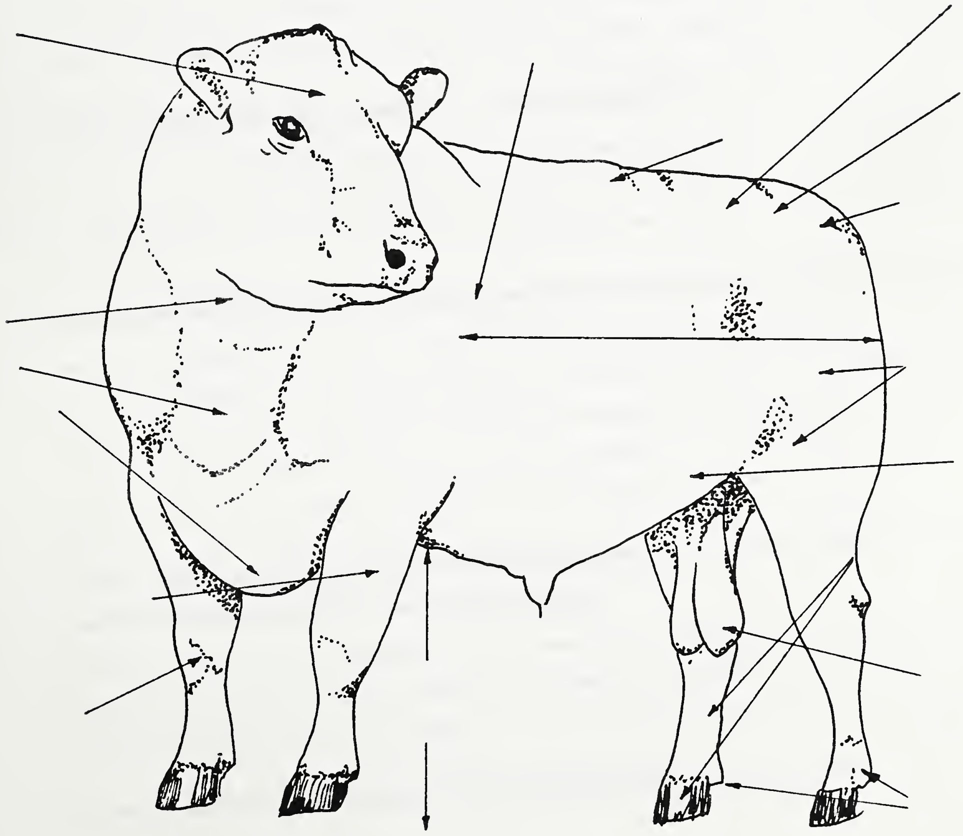
1. A male beef animal used for breeding purposes has qualities that will make certain the offspring will have the necessary qualities required for the various purposes of production.

2. Visit a local beef farm in your area to determine the ideal characteristics of a bull.

3. On the following diagram, label the ideal characteristics of a bull.

4. Use the evaluation chart on the next page to grade your work.

IDEAL CHARACTERISTICS OF A BULL



Ideal Characteristics of a Bull	Excellent	Satisfactory	Unsatisfactory
Visited a local beef farm.			
Marked the ideal characteristics of a bull on the diagram.			
Described the ideal characteristics of a bull.			

JOB SHEET 29
HANDLING AND SHOWING LIVESTOCK

Visit a fair or other event where animals are being shown. Talk to the people selling or buying livestock, then answer the following questions.

1. What animals were shown at this fair?

2. What is the purpose of showing livestock?

3. What equipment was used to groom the animals for showing?

4. What other tasks were performed by the handlers to ensure that their livestock showed well?

5. What other things did you learn about livestock production from this visit? For example, if an animal received a red ribbon, what did this mean?

6. Use the chart on the next page to assist you in evaluating your assignment.

Handling and Showing Livestock	Excellent	Satisfactory	Unsatisfactory
Visited a livestock fair.			
Identified the animals being shown.			
Described the purpose of the livestock show.			
Identified the equipment used for grooming.			
Identified the tasks and jobs the livestock producers did.			

JOBS IN THE LIVESTOCK INDUSTRY

There are many different jobs in the livestock industry. Some of these jobs involve the care and raising of animals. Other jobs are in the processing industries. Processors prepare livestock products for others to use. There are also related jobs for people who provide supplies and services to the farmers raising the livestock.

The following is a list of some of the jobs commonly available in the production and processing of livestock.

- Farm or ranch hand
- Auctioneer
- Animal care attendant
- Truck driver
- Butcher
- Dairy plant worker
- Sheep shearer
- Veterinarian
- Sales people, janitors, and clerical staff in retail or processing outlets
- Feedlot employee
- Cattle buyer
- Feedmill operator
- Meat packer
- Beekeeper
- Livestock producer
- Equipment operator

STUDENT ACTIVITIES

1. What other jobs related to the livestock industry are available in your community?

2. a. Choose a job that is part of the livestock industry and, with classmates, brainstorm the tasks that may be part of this job. List the tasks below.

b. What education and training is needed to do this job?

Note: You may use library, counselling, and other sources of career information.

____

____

____

c. Where is this type of work done (e.g., on a farm, at a feedlot, in a butcher's shop)?

____

____

____

d. Are there many similar job opportunities in your community? Describe some of the available opportunities and attach classified job advertisements to this page.

____

JOB SHEET 30

INVESTIGATING LIVESTOCK PRODUCTION JOBS IN THE COMMUNITY

Investigate job and career opportunities in one type of livestock production in your community. Some possibilities are:

- beef cattle production:
  Feedlot worker→trucker→meat packing plant→butcher shop→consumer
- dairy cattle production:
  Dairy operation→truck driver→dairy or cheese plant→grocery store/supermarket→consumer
- a beekeeping operation:
  Apiary→honey house→grocery store/supermarket→consumer
- chicken production:
  Hatchery→poultry farm→trucker→meat packing plant→grocery store/supermarket→consumer

1. Describe the livestock investigated.

2. Show the chain of jobs that help get livestock from the producer and processor to the consumer. (Underline the job that is of most interest to you.)

3. List the tasks performed by a worker in the job underlined.

4. Jobs on the farm often result in jobs in other areas. Give jobs on the farm and jobs that relate or result from this job in the supply or service field.

Jobs on the Farm	Supply and Service Jobs

5. What is the average hourly/weekly/monthly/annual wage for an entry-level employee in each of the jobs shown in '2' on the job sheet.

Job	AVERAGE WAGE			
	Hourly	Weekly	Monthly	Annual

6. Use the following form to evaluate your work.

Investigating Livestock Production Jobs in the Community	Excellent 4	Good 3	Average 2	Not Acceptable 1
Investigated one type of livestock production in the community.				
Indicated the chain of jobs to get this product from the producer to the consumer.				
Listed the tasks performed by a worker in one job in the chain.				
Indicated the average entry-level wages in each of the jobs in the chain.				

Key

1	Not Acceptable
2	Average
3	Good
4	Excellent

STUDENT ACTIVITIES

BEEF PRODUCTION

Match each definition to a term by placing the letter beside the definition in the appropriate blank.

______ Beef

______ Veal

______ Feeder Cattle

______ Slaughter Cattle

______ Heifer

______ Sire

______ Steer

______ Bull

______ Dam

______ Herd

______ Calf

______ Polled

______ Purebred

______ Breed

A. without horns

B. beef animals that have been feeding on grass and are ready to go into the feedlot

C. a female beef that has not had a calf

D. a castrated male beef animal

E. uncastrated male beef animal

F. a group of cattle having a distinctive origin and recognizable characteristics as a result of selective mating over time

G. meat from a young calf

H. female parent

I. cattle that are ready for processing

J. a beef animal whose ancestors belonged to one breed and is, therefore, eligible for official registration

K. male parent

L. a number of cattle grouped together

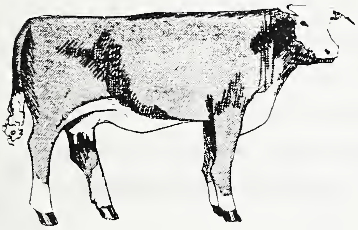
M. meat from cattle

N. a beef animal younger than one year

JOB SHEET 31
BEEF PRODUCTION

Visit a local cattle farm and identify the characteristics of each of the following cattle.

A.



Breed: ____________________

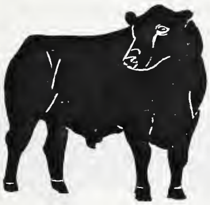
Characteristics: ____________________

____

____

____

B.



Breed: ____________________

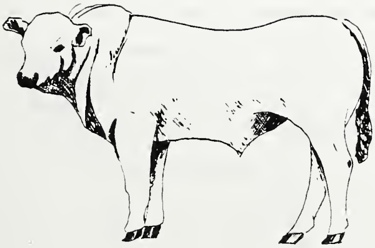
Characteristics: ____________________

____

____

____

C.



Breed: ____________________

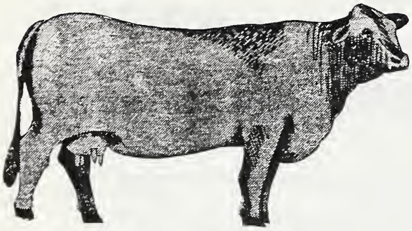
Characteristics: ____________________

____

____

____

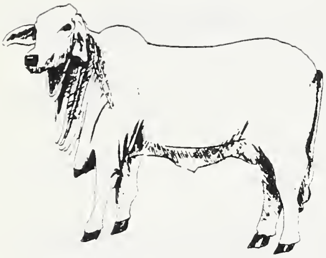
D.



Breed: ____________________

Characteristics: ____________________

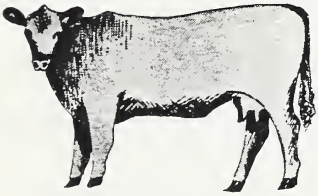
E.



Breed: ____________________

Characteristics: ____________________

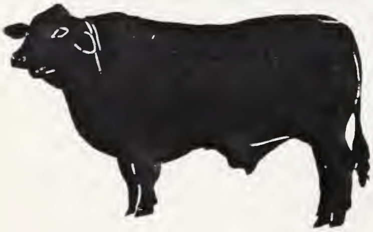
F.



Breed: ____________________

Characteristics: ____________________

G.



Breed: ____________________

Characteristics: ____________________

H.

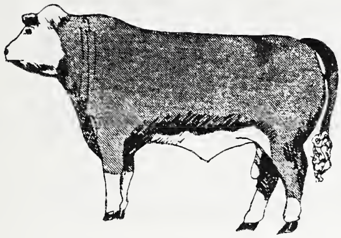
Breed: ____________________

Characteristics: ____________________

____

____

____



I.

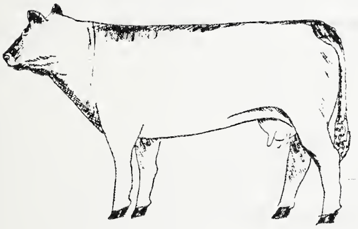
Breed: ____________________

Characteristics: ____________________

____

____

____



J.

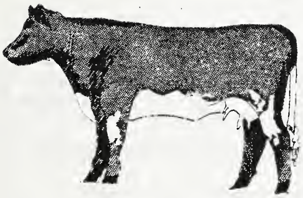
Breed: ____________________

Characteristics: ____________________

____

____

____



K.

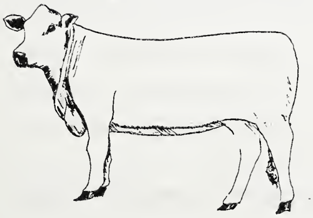
Breed: ____________________

Characteristics: ____________________

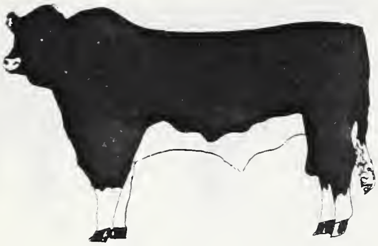
____

____

____



L.



Breed: ____________________

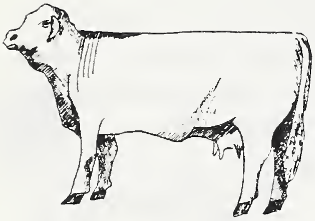
Characteristics: ____________________

____

____

____

M.



Breed: ____________________

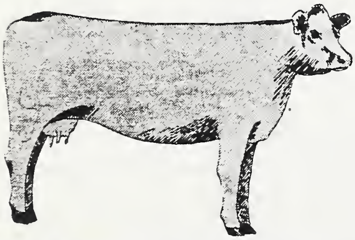
Characteristics: ____________________

____

____

____

N.



Breed: ____________________

Characteristics: ____________________

____

____

____

Use the evaluation form to grade your assignment.

Beef Production	Excellent 4	Good 3	Average 2	Not Acceptable 1
Visited a farm.				
Identified each breed of cattle.				
Identified the characteristics of each breed.				

Key

1	Not Acceptable
2	Average
3	Good
4	Excellent

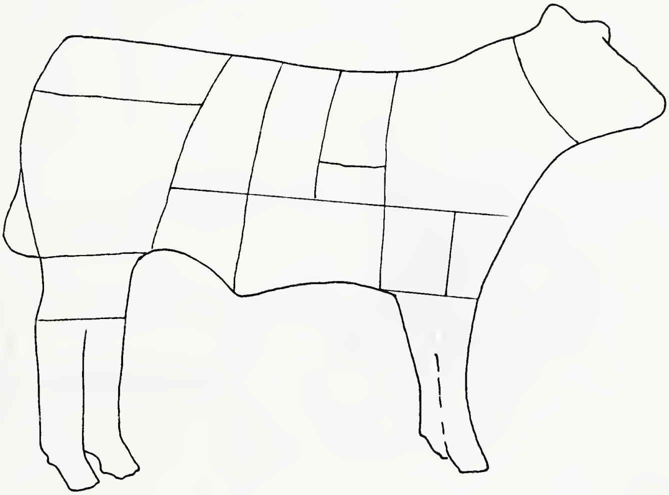
JOB SHEET 32
IDENTIFYING CUTS OF BEEF

1. Visit a local butcher shop in your area to identify the different cuts of beef.

2. On the diagram below, label the different cuts of beef.

3. Indicate the percentage of cut for each area of the beef.

CUTS OF BEEF



	Cut	%
a.	______________________	_____________
b.	______________________	_____________
c.	______________________	_____________
d.	______________________	_____________
e.	______________________	_____________
f.	______________________	_____________
g.	______________________	_____________
h.	______________________	_____________
i.	______________________	_____________
j.	______________________	_____________
k.	______________________	_____________
l.	______________________	_____________

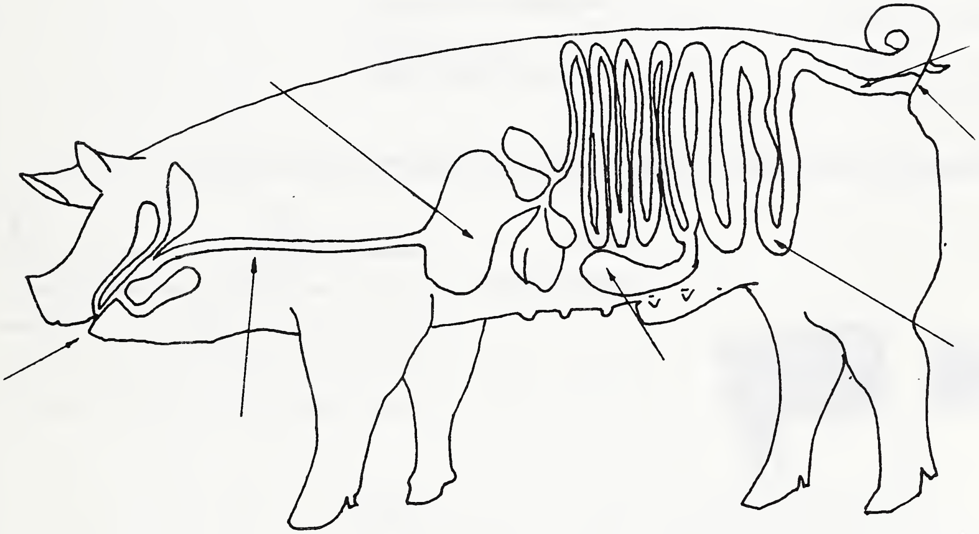
4. Use the following chart to evaluate your work.

Identifying Cuts of Beef	Unsatisfactory	Satisfactory	Excellent
Visited a local butcher shop.			
Identified the cuts of beef.			
Indicated the percentage of each cut of beef.			

STUDENT ACTIVITIES

Using a wide variety of resources, label the following diagram of the parts of a pig.

PARTS OF A PIG



JOB SHEET 33
SWINE PRODUCTION

Visit a local hog farm or interview your local district agriculturalist to answer the following questions.

1. Match each definition with one of the listed terms.

______ Market Hogs

______ Boars

______ Sows

______ Barrows

______ Gilts

A. female swine that have borne young

B. female swine that have not borne young

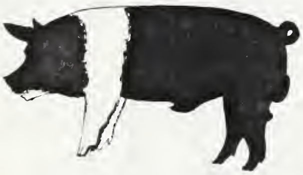
C. swine raised for slaughter at approximately 240 pounds

D. castrated male swine

E. uncastrated male swine

2. Indicate the breed and characteristics of each of the following breeds of swine.

A.



Breed: ______________________________

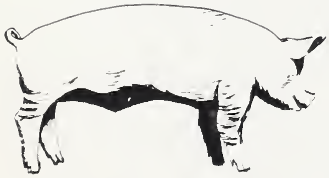
Characteristics: ______________________________

____

____

____

B.



Breed: ______________________________

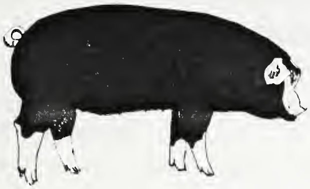
Characteristics: ______________________________

____

____

____

C.



Breed: ______________________

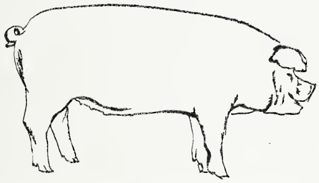
Characteristics: ______________________

____

____

____

D.



Breed: ______________________

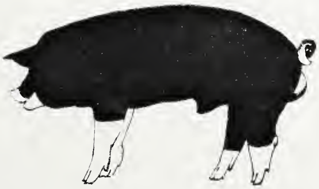
Characteristics: ______________________

____

____

____

E.



Breed: ______________________

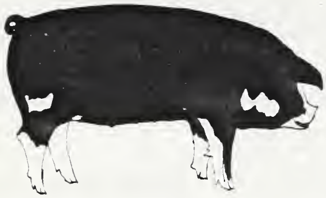
Characteristics: ______________________

____

____

____

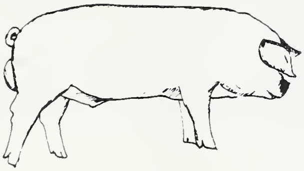
F.



Breed: ____________________

Characteristics: ____________________

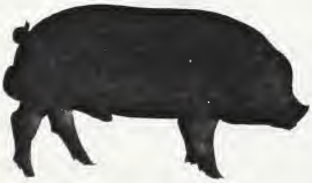
G.



Breed: ____________________

Characteristics: ____________________

H.



Breed: ____________________

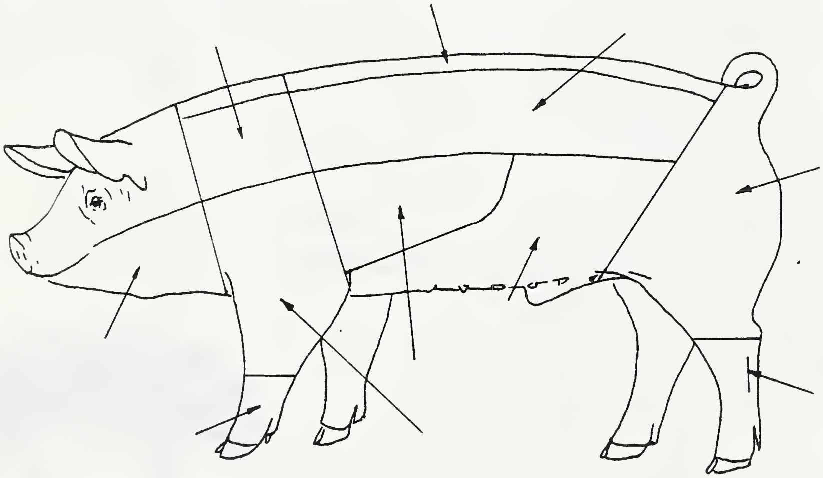
Characteristics: ____________________

3. Use the chart on the next page to evaluate your work.

Swine Production	Excellent	Satisfactory	Unsatisfactory
Visited a farm.			
Identified various sexes and stages of swine.			
Identified the breeds and characteristics of various swine.			

JOB SHEET 34
IDENTIFYING CUTS OF PORK

1. Visit a local butcher in your area to identify the different cuts of pork.
2. On the diagram below, label the different cuts of pork.
3. Indicate the percentage of each pork cut.
4. Use the chart on the following page to evaluate your work.



Pork Cuts	Excellent	Satisfactory	Unsatisfactory
Visited a local butcher shop.			
Indicated the cuts of pork on a diagram.			
Indicated the percentages of each pork cut.			

ANIMAL HEALTH

Maintaining healthy animals is very important. The level and grade of production is affected by the health of the animal. If the animal is not healthy, production is reduced which means that the farmer will receive less money for the livestock.

Factors which do affect the health of an animal may include:

- parasites
- diseases.

It is, therefore, important that you are able to distinguish an unhealthy animal from a healthy animal. It is important, also, to know how to treat the animal for an illness or when it is necessary to receive professional help.

JOB SHEET 35
MAINTAINING ANIMAL HEALTH

Visit your local veterinarian to answer the following questions.

1. List five signs of a healthy animal.

2. List five signs of an unhealthy animal.

3. a. Why is an animal's temperature taken by the rectal method?

   b. What is the normal rectal temperature of a healthy animal?

4. Name five practices used to maintain the health of animals.

5. a. List five disinfectants used to maintain the health of animals.

b. Describe the purpose of each disinfectant.

6. a. List four antiseptics used to maintain the health of animals.

b. Describe the purpose of each antiseptic.

7. What methods are used to give medication to animals (e.g., nasal)?

8. In context of animal health care, what are the following instruments used for?

   a. syringe ____________________
   b. thermometer ____________________
   c. balling gun ____________________
   d. speculum ____________________
   e. implant gun ____________________

9. How would you give iron to a baby pig? List the equipment needed and the method you would use.

10. a. Explain how you would give an injection of blackleg vaccine to a steer.

    b. What will this vaccine do?

11. What medical procedures are followed when branding, tagging and dehorning cattle?

Branding: ______________________________

____

____

____

____

____

Tagging: ______________________________

____

____

____

Delivering: ______________________________

____

____

____

____

12. a. What is a parasite?

____

____

b. Name four common external parasites.

____

____

____

____

c. Draw the life cycle of an external parasite.

13. Match each disease with its proper description.

Diseases

______ Blackleg

______ Shipping Fever

______ Pinkeye

______ Pneumonia

______ Foot Rot

______ Scours

______ Mastitis

______ Brucellosis

______ Bloat

Descriptions

A. An eye infection found in cattle, sheep and goats. Symptoms include swelling of lining of eyelids.

B. A disease found in cattle, goats and sheep. Symptoms include lameness, hoof infection, odour.

C. A highly infectious disease which is normally fatal and affects young cattle. Symptoms include high fever, lameness, no appetite, swelling.

D. A lung inflammation affecting all animals. Symptoms include crackling noises when breathing, standing with feet spread, quick shallow respiration.

E. A viral/bacterial infection afflicting cattle and sheep. Symptoms include difficulty in breathing, high fever, mucous discharge from eyes and nose, coughing.

F. An inflammation of the udder seen in cattle, sheep, goats and swine. Symptoms include a tender, hard and hot udder, milk may be watery or lumpy.

G. A disease affecting ruminants, stemming from trapped, fermented gas due to high-concentrated, low-roughage rations. Symptoms include enlarged gut and problems with breathing.

H. A disease experienced by newborn calves. Symptoms include diarrhea, sunken eyes and rough coat.

I. Bang's disease, affecting cattle, goats and swine. Symptoms include abortion (i.e., the premature natural birth of the fetus many weeks before its intended birth).

14. Choose four of the diseases listed and describe the treatment usually given.

15. Use the following chart to evaluate your assignment.

Maintaining Animal Health	Excellent 4	Good 3	Average 2	Not Acceptable 1
Visited a veterinarian.				
Listed five signs of a healthy animal.				
Gave the normal rectal temperature of a healthy animal.				
Listed five practices for maintaining a healthy animal.				
Listed four antiseptics and their purposes.				
Listed four methods of administering medication to animals.				
Identified the use of several medical instruments.				
Explained how to give iron to a baby pig.				
Explained how to give a blackleg injection to a steer.				
Listed the medical procedures necessary during branding, tagging and dehorning.				
Drew the life cycle of an external parasite.				
Named four common external parasites.				
Identified various diseases.				
Described the treatment and control of four diseases.				

Key

1	Not Acceptable
2	Average
3	Good
4	Excellent

FARM MANAGEMENT

In order to maintain a successful business, farmers and farm workers must be able to meet certain standards. These include:

- Supply Management Standards
- Work Standards.

SUPPLY MANAGEMENT

Supply management standards are designed to protect the farmer's property (e.g., equipment, tools, supplies, crops, livestock). Each item used or produced on a farm is usually recorded on an inventory.

An inventory is a list of equipment, tools or products. An inventory may be done of a farm, a manufacturer, an equipment dealer, or an office. Keeping an up-to-date inventory is part of any business operation.

Inventories are used to determine:

- what materials are on hand and what must be bought to do a certain job
- the value of the site for insurance
- if equipment is getting old and in need of replacement
- theft and loss of goods
- business success or failure.

Some businesses take inventory once a year; other businesses take inventory more frequently. This means that every day, week or month, a list of what was added and used may be found as part of the inventory.

An inventory is usually in the form of a chart. It may be done by hand or on a computer. An inventory may include the following information:

- name of the item(s)
- date purchased
- purchase price
- present value
- unit price
- quantity of an item on hand.

On a farm, there are two types of inventories:

- an inventory of equipment, tools and supplies used in crop and livestock production
- an inventory of the product grown on the farm.

The following is an example of an inventory which contains both of the above items.

BEGINNING INVENTORY

January 1, 1989

Item or Description	Total Value		VALUE TO THE ENTERPRISE							
			1 Wheat		2 Beef		3		4	
Wheat – 25 tonnes @ $180	4,500	00	4,500	00						
Hay Bales – 30 @ $35	1,050	00			1,050	00				
1 Reg. 590 kg Hereford Bull	2,500	00			2,500	00				
20 bred cows @ $900	18,000	00			18,000	00				
23 steers 363 kg @ $700	16,100	00			16,100	00				

STUDENT ACTIVITIES

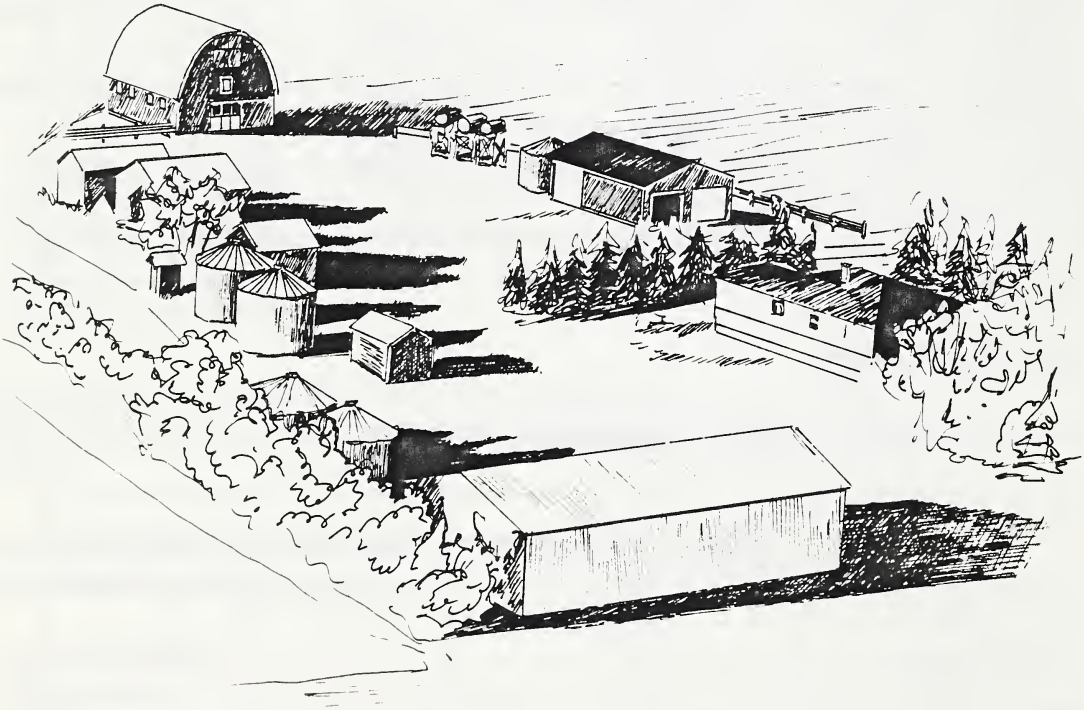
Visit a local farm equipment dealership to complete the following table.

Equipment	Date of Purchase	Purchase Price	Depreciation	Present Value
100HP tractor				
1985 pick-up truck				
Electric fence supplies				
Stock trailer				

FARM STORAGE PRACTICES

Farmers tend to use two types of storage: one for equipment, tools and supplies and the other for the products grown. A garage, machine shed or shop is commonly used to store farm equipment. These buildings protect the equipment when not in use. One of the tasks on the farm is the building and repair of these storage facilities.

The type of farm storage used depends on the type of farm operation. For example, a grain operation needs granaries for the harvested grain. A dairy operation needs a shelter for the animals and uses refrigerated tanks for holding the milk. A swine operation needs a barn to house the growing pigs. Most livestock operations also need storage for the animals' food.



WORK STANDARDS

Farm work standards are the behaviours expected of those who work on a farm. These standards include **time and task management.**

Farmers must plan when to do their work. They must organize their tasks by season, and their time to do the most important tasks of a day first. Time management involves planning when and what tasks to do. Effective time management involves:

- listing the tasks to be done
- estimating how long it will take to do each task
- deciding which task to do first
- doing the tasks in priority order.

Some tasks are organized on a daily basis. For example, a livestock dairy farmer must milk, feed, and care for the cows daily.

Some tasks are seasonal. That is, they are done only at certain times of the year. For example, every spring, grain farmers must make crop planting decisions. They must organize their days to prepare the equipment and plant the crop at the appropriate time.

STUDENT ACTIVITIES

1. Visit a local farm to learn about the inventory and storage practices it uses. Complete the following information during your visit.

   a. What type of farm is being operated? ______________________________

   ____

   b. What storage facilities are used for equipment and tools? ______________________________

   ____

   ____

   c. What storage facilities are used for the products grown on this farm? (If it is a livestock operation, include the storage used for feed.) ______________________________

   ____

   ____

   d. How and by whom is inventory kept? ______________________________

   ____

   e. How frequently is inventory taken? ______________________________

2. Proper maintenance of storage facilities is an important part of farming.

   a. What tasks would a farm worker be expected to perform in order to keep storage facilities in good operating condition? ______________________________

   ____

   ____

   ____

   ____

   b. What skills might be useful to a farm worker if his or her job involved maintaining storage facilities? ______________________________

   ____

   ____

   ____

   c. Use a copy of Appendix 3: Record of Field Experiences, to record field experiences involved with farm management, inventory control, storage maintenance, and related tasks.

3. Practise time management by planning the tasks that you want to do tomorrow. Use the chart below to do your planning.

   a. List all the tasks that you want to do tomorrow. Include your regular activities like eating, sleeping, and going to school.

   b. Estimate how much time is needed to do each task.

   c. Pick the most important and put '1' beside it in the "Priority" column. This is the task you will do first. Put '2' beside the second most important task. Do this for all the tasks listed.

   d. For each task, plan "when" or the time you will do the task. If you do not have enough time to do all the tasks, make sure that those that are first on the list are the most important.

   e. In the last column, place a check mark when the task is completed.

______________________________'S TO DO LIST

(Student's Name)

Task	Time to Do	Priority	When	✓

4. Use a copy of Appendix 2: Work Standards and Management Monthly Evaluation Chart to record your performance each month. Clip each month's completed chart to the cover of this student workbook.

GLOSSARY

Agricultural industry	–	companies and individuals involved in the production, processing and distribution of farm products.
Commodity	–	a product of agriculture which is bought or sold; e.g., wheat, milk, cattle.
Consumer	–	an individual who uses agricultural products.
Cover crop	–	crop used to cover the soil surface to decrease erosion.
Crop rotation	–	the practice of growing different crops on a field to preserve the production power of the soil.
Demand	–	the quantity of a good product consumers are willing and able to purchase.
Distribution	–	means by which agricultural products are made available to consumers.
Erosion	–	removal of soil by wind and/or water.
Forage and pasture crops	–	plants grown for their leaf or plant parts and used as a livestock feed; e.g., hay, silage.
Fungicide	–	a pesticide used to kill fungi.
Germination	–	process in which seed changes into a developing seedling.
Herbicide	–	a pesticide used to kill plants.
Insecticide	–	a pesticide used to kill insects.

Legume	– a plant with dry pods splitting along two sutures; e.g., alfalfa, clover.
Mineral	– inorganic elements in soil.
Organic matter	– decomposing plant and animal material in or on soil.
Pesticide	– a chemical used to kill insects, weeds or diseases.
Processing	– preparing farm products for use by the consumer; e.g., milling wheat for flour, packaging beef.
Production	– growing agriculture.
Root and tube crops	– plants grown for their underground storage organs; e.g., sugar beets, potatoes.
Soil	– outer layer of earth's crust made up of minerals and organic matter capable of supporting plant growth.
Strip cropping	– practice of growing separate crops in alternate strips for the purpose of reducing erosion.
Supply	– amount or quantity of goods or services offered for sale in a given market at given prices over a given period of time.
Value of production	– amount of a commodity times the season average price.

AGRICULTURAL PRODUCTION 26
PROFILE

JOB SCOPE	1 Identifies local job and career opportunities	2 Identifies local agricultural producers	3 Identifies local agricultural service operations	4 Identifies local agricultural processing operations
	5 Identifies local agricultural sales operations			
HISTORICAL DEVELOPMENT OF AGRICULTURE	1 Identifies trends in agricultural production in Alberta	2 Identifies changes in Alberta's agricultural production	3 Identifies reasons for changes in Alberta's agricultural production	4 Describes the scope of the food industry
FOOD CHAIN	1 Describes the purpose of a food chain	2 Describes relationship between the parts of a food chain		
PRODUCERS AND CONSUMERS	1 Recognizes the relationship between producers and consumers	2 Recognizes the relationship between supply and demand	3 Recognizes the importance of consumer trends	4 Recognizes the purpose of advertising
	5 Appreciates the importance of packaging	6 Identifies basic consumer protection laws		
FACTORS OF PRODUCTION	1 Recognizes regional factors of production	2 Recognizes the effect of climate on production	3 Recognizes the effect of soil and water on production	4 Recognizes the effect of the market on products
	5 Recognizes the effect of transportation on production			
SAFETY	1 Recognizes the importance of safety on the farm	2 Uses safe practices handling farm machinery	3 Uses safe practices when working with animals	4 Demonstrates proper hand protection
	5 Demonstrates proper eye protection	6 Demonstrates proper hearing protection	7 Demonstrates proper respiratory protection	8 Demonstrates proper hand and foot protection

AGRICULTURAL PRODUCTION 26 PROFILE (continued)

LAND	1 Lists and describes land produced agricultural products	2 Identifies the mineral content of soil	3 Identifies organic content of soil	4 Identifies the importance of air in the soil
	5 Takes and tests soil samples	6 Identifies various soil types	7 Identifies types of land care equipment	8 Demonstrates ability to follow operating procedures on land care equipment
	9 Demonstrates the causes of soil erosion			
PLANT PRODUCTION	1 Identifies and describes how plants grow	2 Describes photosynthesis	3 Describes respiration	4 Describes translocation
	5 Describes transpiration	6 Identifies legume parts and root types	7 Lists plant products grown for sale in Alberta	8 Recognizes the relationship between plant production and jobs
	9 Identifies crop seeds grown in Alberta	10 Understands the operation of a grain elevator	11 Understands the reason for rotating crops	12 Grows and manages an indoor crop
	13 Identifies dangers to crops	14 Recognizes the purpose of crop insurance	15 Plans a demonstration plot	16 Grows a demonstration plot
	17 Understands the varieties and purposes of fertilizers	18 Describes and identifies various plant pests and diseases		

AGRICULTURAL PRODUCTION 26
PROFILE (continued)

LIVESTOCK PRODUCTION	1 Demonstrates a positive attitude toward livestock care and management	2 Identifies types of livestock in Alberta	3 Identifies the needs of livestock	4 Recognizes methods used to handle and show livestock
	5 Identifies jobs in the livestock industry	6 Identifies indicators of finish of beef cattle	7 Identifies ideal characteristics of dairy cattle	8 Identifies ideal characteristics of breeding stock
	9 Identifies cuts of beef	10 Identifies characteristics of swine	11 Identifies cuts of pork	12 Recognizes the importance of animal health
FARM MANAGEMENT	1 ***A. WORK STANDARDS*** Appreciates the importance of work standards	2 Demonstrates time management ability	3 Demonstrates ability to manage a variety of tasks	
	1 ***B. SUPPLY MANAGEMENT*** Appreciates value of managing equipment, tools, supplies, etc.	2 Recognizes local supply management practices		
	1 ***C. WORK AREA MANAGEMENT*** Appreciates need for organizational skills	2 Recognizes need for framework		

WORK STANDARDS AND MANAGEMENT MONTHLY EVALUATION CHART

Name ______________________________ Date ______________________________	Evaluation	
	Satisfactory	Unsatisfactory
DEMONSTRATES APPROPRIATE WORK HABITS		
Is punctual		
Comes prepared to work		
Prepares immediately for work		
Performs duties as instructed, with acceptable accuracy		
Uses time productively		
Considers solutions to problems before asking for assistance		
FOLLOWS RULES AND REGULATIONS		
Follows acceptable safety and sanitation procedures		
Does not bring food or drink into the work area		
Dresses appropriately		
Uses equipment, tools and supplies as instructed		
Clears work area after use		
Performs required clean-up duties		
DEMONSTRATES CONCERN FOR SAFETY		
Demonstrates safety practices		
Maintains a safe and sanitary work area		
Wipes up spills immediately		
Does not leave work area without permission		
DEMONSTRATES PROFESSIONAL ATTITUDE		
Displays a professional appearance		
Is friendly and courteous		
Advises teacher/supervisor of hazards or necessary repairs		
Informs teacher/supervisor in advance of necessary absences		
Demonstrates responsibility for completion of assignments and tasks		
Follows verbal and written instructions		
Demonstrates an organized work approach		

Areas to improve next month are:

____

RECORD OF FIELD EXPERIENCE

Location: ____________________

Date(s) worked. From: ____________ To: ____________

Supervisor: ____________________

Hours of operation: ____________________

Clothing required: ____________________

Part A

Supplies and services offered: ____________________

Type of work performed (list jobs): ____________________

Wages of an entry-level employee: ____________________

Other information about the business: ____________________

Part B

Jobs I really enjoyed doing: ____________________

Further training needed (Can this training be obtained in the community? Where?): ____________________

People with whom I worked (names/telephone numbers): ____________________

Jobs that I was very good at doing: ____________________

Jobs in which I need to improve: ____________________

Other information about the field experience: ____________________

COMMUNITY PARTNERSHIP EVALUATION FORM
(Community Partner)

STUDENT ____________________

COMMUNITY PARTNER ____________________

TYPE OF BUSINESS ____________________

Period of Partnership
From ____ to ____

	PERFORMANCE LEVEL			
	High	**Med**	**Low**	**N.A.**
1. Career Awareness a. Appreciates the nature of the industry/business b. Identifies variety of jobs/careers in occupational cluster c. Appreciates the need for job search skills d. Appreciates the job requirements e. Dresses appropriately for the job				
2. Human Relations a. Maintains good relations b. Communicates effectively c. Practises ethical behaviour d. Demonstrates dependability e. Demonstrates interest in area f. Adheres to work standards g. Displays a positive attitude h. Respects the opinions and property of others				
3. Core Skills a. Follows instructions/directions b. Completes necessary forms c. Uses metric/imperial measures d. Demonstrates entry-level math functions e. Demonstrates entry-level tools and equipment competencies f. Demonstrates entry-level ability to handle supplies				
4. Work Skills a. Demonstrates appropriate competencies b. Demonstrates pride in work c. Demonstrates entry-level sanitation practices d. Demonstrates entry-level safety practices e. Shows initiative f. Shows creative ability g. Practises effective time management				
5. Entrepreneurship a. Recognizes possible self-employment opportunities				
6. Other Comments				

Teacher: ________ **Student:** ________ **Community Partner:** ________

COMMUNITY PARTNERSHIP EVALUATION FORM
(Student)

1. Do you feel that this experience:

   a. has been of benefit to you?

   Yes ___ No ___

   How? ______ Why not? ______

   b. has helped to prepare you for the world of work?

   Yes ___ No ___

   How? ______ Why not? ______

   c. has expanded your learning opportunities?

   Yes ___ No ___

   How? ______ Why not? ______

2. What difficulties arose?

3. What strengths/abilities did you discover in yourself as a result of this experience?

4. Do you have any suggestions for improving this program?

Placement Location: ______ Date: ______

Employer/Supervisor: ______ Signature: ______
Student

JOB SHEET EVALUATION RECORD

JOB SHEET	EVALUATION								
	Self			Classmate			Teacher/Supervisor		
	1	2	3	1	2	3	1	2	3
1. The Food Industry									
2. Working in the Food Industry									
3. Supply and Demand									
4. Packaging in the Food Industry									
5. Soil Samples									
6. Soil Water Holding Capacity									
7. Organic Matter in Soil									
8. Soil Types									
9. Operating Land Care Equipment									
10. Observing Water Erosion on Soil, Due to Methods of Cultivation									
11. Observing Soil Erosion Due to Water									
12. Plant Transpiration									
13. Parts of a Legume									
14. Root Types									
15. Crop Seeds									
16. The Grain Elevator									
17. Crop Rotation									
18. Planning an Indoor Crop									

JOB SHEET EVALUATION RECORD (continued)

JOB SHEET	EVALUATION								
	Self			Classmate			Teacher/Supervisor		
	1	2	3	1	2	3	1	2	3
19. Growing an Indoor Crop									
20. Planning a Demonstration Plot									
21. Growing a Demonstration Plot									
22. Identifying Fertilizers									
23. Crop Pests and Diseases									
24. Livestock Production									
25. Livestock									
26. Indicators of Finish									
27. Ideal Characteristics of a Cow									
28. Ideal Characteristics of a Bull									
29. Handling and Showing Livestock									
30. Investigating Livestock Production Jobs in the Community									
31. Beef Production									
32. Identifying Cuts of Beef									
33. Swine Production									
34. Identifying Cuts of Pork									
35. Maintaining Animal Health									

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